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—. See also Rowland, S. J., jt. author, 229, *bis.*
Zeller, H., 268.
Zofijevsky, V., 254.
Zottner, G. See Velu, H., jt. author, 240.

The Editor will be glad to receive publications relating to Veterinary Science and cognate subjects in order that they may be dealt with in the *Veterinary Bulletin.*

Reports of Departments, Special Reports, reprints, etc., etc., should be sent as soon as they are issued.

Books for Review.

The Editor will be glad to receive books for review in the *Veterinary Bulletin.*

Bulletins on disease subjects written for farmers and "popular" articles of a similar nature are not included in the *Veterinary Bulletin.* Those of a sufficiently important nature, are, however, included in *Index Veterinarius*; so also are certain review articles, presidential addresses, congress proceedings, etc., where the title conveys as much information as could be given in an abstract of a few lines. For information of this nature, readers of the *Veterinary Bulletin* are referred to *Index Veterinarius*, where titles of all publications indexed by the bureau are fully cross-referenced.

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IMPERIAL BUREAU OF ANIMAL HEALTH

THE

VETERINARY BULLETIN

Vol. 10.] **April, 1940.** [No. 4.

DISEASES CAUSED BY BACTERIA AND FUNGI

MURPHY, J. M. (1939). **The Value of the Hotis Test in Detecting Mastitis Streptococci in Milk.**—*Cornell Vet.* **29.** 279-286. 5 tables. [5 refs.]

M. applied the Hotis test [see *V. B.* **8.** 555.] to quarter and composite samples of milk from 140 cows in one herd. The results were compared with those obtained by cultural examination on blood agar. Taking the latter as accurate, the Hotis test detected 95% of quarter samples containing *Str. agalactiae* (Group I mastitis streptococcus), but when infection with other streptococci was present the efficiency of the test was reduced to approximately 25% and 6% for quarter and composite samples respectively. Thus, in an examination of milk samples by this test, unless the type of streptococcus infection present is known, the value of the test cannot be assessed.—GWILYM O. DAVIES.

I. DAVIS, J. G., & MCCLEMONT, J. (1938). **Mastitis in Relation to the Methylene Blue Reduction Test.**—*Abst. Proc. Soc. agric. Bact., 1938.* pp. 30-31. Reading: National Institute for Research in Dairying.

II. EDWARDS, S. J. (1938). **The Diagnosis of Str. agalactiae in a Liquid Selective Medium.**—*Ibid.* pp. 34-35. 1 table.

III. ZEIN-EL-DINE, M., & ROWLAND, S. J. (1938). **The Indirect Methods of Mastitis Diagnosis.**—*Ibid.* pp. 36-37.

IV. ROWLAND, S. J., & ZEIN-EL-DINE, M. (1938). **The Value of Indirect Methods for the Detection of Mastitis.**—*J. Dairy. Res.* **10.** 108-113. 2 tables. [12 refs.]

V. ROWLAND, S. J., & ZEIN-EL-DINE, M. (1939). **The Casein Number for Diagnosis of Mastitis. II. The Effect of Advanced Lactation and of Storage and Preservation of the Milk Sample.**—*Ibid.* 267-271. 4 tables. [2 refs.] [See also *V. B.* **9.** 135].

I. The effect on the methylene blue test of milk infected with mastitis streptococci is discussed. Tests were carried out with infected and non-infected milk samples, and it was found that mastitis shortens the reduction time. This effect however is not of much value for the diagnosis of mastitis. The decrease in reduction time may be attributed partly to body cells and partly to the organisms associated with mastitis.

II. E. considers that at the first examination of a herd for mastitis cultural examination of milk samples should be made by deep plating in blood agar, but

for subsequent examinations of the clean section of the herd much economy of labour may be effected by using a liquid medium having a glucose-broth base. The medium, the composition of which is given, contains crystal violet and sodium azide to inhibit the growth of other organisms. It is simple to prepare, can be stored in tubes for immediate use, and streptococcus growths in it are easily recognized.

III & IV. These papers give the results of a series of experiments devised to gauge the comparative efficiency of a number of indirect methods used for the diagnosis of mastitis. The tests are based on the detection of various changes which take place in the milk as a result of the infection. The tests were done on quarter-milk samples from cows in full milk from Shorthorn, Friesian, Ayrshire and Guernsey herds almost free from clinical mastitis. They were placed in the following descending order of their value for diagnosis :– casein number, chloride content, centrifuge deposit, solids-not-fat content, brom-cresol-purple reaction, brom-thymol-blue reaction, presence of clots, palpation and catalase. The tests were controlled bacteriologically by plating milk sediment on selective crystal-violet: aesculin: blood-agar medium (Edwards).

V. In a previous paper [see *V. B.* **9.** 135] the authors showed that the determination of the percentage of casein nitrogen in the total nitrogen of milk—the casein number—from individual quarters, was a valuable indirect test for the diagnosis of mastitis. A figure of 78·0 or less was regarded as evidence of an infected quarter.

Further studies with this test have now shown that it is not satisfactory for cows in the drying-off stage, as all quarters in advanced lactation produce milk with a casein number below normal. Experiments also show that milk samples to be tested should not be kept at room temperature for more than a few hours before analysis. Samples, kept at 0-2°C. or kept at room temperature with the addition 0·2, 0·05 and 0·01 g. potassium dichromate, formalin or mercuric chloride, respectively, per 100 ml. of milk, show no appreciable change of the index number for 24 to 48 hours.—Gwilym O. Davies.

Hastings, E. G., & Beach, B. A. (1939). **A Further Study of the Production of Milk of Abnormal Composition by Cows Free from Udder Streptococci.**—*J. agric. Res.* **58.** 543-556. 6 tables. [2 refs.]

In this study, fore milk was considered to be normal when it had a pH below 6·8, a catalase value below 50, and a Cl content below 0·15%.

In a previous report [*V. B.* **8.** 3.], the results of regular tests on the milk of 31 first-calf cows were described. Some of these cows have now been studied during the second lactation and can be divided into four groups :– three cows which were normal in both lactations, one cow normal in the first and abnormal in the second, three cows doubtful in the first and abnormal in the second, and seven cows abnormal in both lactations.

In the opinion of the authors, these abnormalities could not be associated with any bacterial cause or any transmissible agent. They continued for considerable periods, although there were no physical changes in the milk or udder. From this study it appears unwise to conclude that the udder is diseased solely on the results of chemical tests on the milk. The tentative conclusion is advanced on the basis of experiments that *Str. agalactiae* infection is more easily established in abnormal than in normal quarters. The fact that infection with *Str. agalactiae* did not occur in this herd is considered to indicate that this organism is a specific inhabitant of the udder and does not occur in other situations.—John Francis.

EVANS, Alice C., & VERDER, Elizabeth. (1938). **Studies on Hemolytic Streptococci. V. The Characteristics of Human and Animal Strains of Groups A and C.**—*J. Bact.* **36.** 133-147. 4 tables. [Numerous refs.] [For Pt. IV see *V. B.* **9.** 60].

Differentiation of the serological groups by cultural and biochemical tests is discussed. Groups A, C and E can be distinguished from other groups by their sensitivity to nascent phage B. 409 strains of groups A and C from human beings and 147 from animal sources were examined. The fermentation of trehalose, but not of sorbitol, along with resistance to phage B filtrate is a character of Group A, regardless of origin. Strains fermenting sorbitol, but not trehalose, and sensitive to phage B filtrate, and strains not fermenting sorbitol, trehalose or lactose and sensitive to phage B filtrate are of animal origin and are apparently unable to attack man. Group C strains fermenting trehalose, but not sorbitol or lactose, and sensitive to phage B filtrate, may attack man or animals, which probably accounts for some milk-borne epidemics. Sensitivity to phage B filtrate of groups A and C strains is the most reliable single test for indicating the serological group.—J. F.

BIRCH-HIRSCHFELD, L. (1939). Proteolytische Fermentsekretion und ihre pathogenetische Bedeutung bei pyogenen Staphylokokken. [**Proteolytic Ferments of Staphylococci and their Pathogenic Significance**].—*Berl. Münch. tierärztl. Wschr.* May 12th. 306-307.

The author has studied the proteolytic action of a strain of *Staphylococcus albus* which was strongly proteolytic but weakly toxic. It was cultivated on cellophane laid on agar in order to conserve the proteolytic agent, the growth being washed off after 24 hours, centrifuged and filtered.

It is concluded from the study that the proteolytic agent is a secretion of the organism and not a product of autolysis, because the amount present ran parallel with the number of living organisms. It is distinct from toxin. It is a true proteolytic ferment, liquefying plasma, albumin, fibrinogen and casein, etc. The coagulase titre showed a certain relation to the " gelatinase titre ". Its activity was reduced by heat (particularly in purified preparations, a fact attributed to removal of lipoid) and also by a reaction other than neutral. It also hinders the action of thrombogen and presumably has in this way a pathogenic significance. Associated with the coagulation of fibrinogen a true hydrolysis was observed. Coagulation was followed by lysis. A fraction was further isolated which was resistant to heat, acid and alkali, and was very strongly fibrinolytic. No antibodies were produced by injection of this into animals, presumably on account of its small molecular size. Further work is required in order to understand fully the working of these complex factors in the body.—A. W. STABLEFORTH.

PLASTRIDGE, W. N., ANDERSON, E. O., WILLIAMS, L. F., & WEIRETHER, F. J. (1939). **Infectious Bovine Mastitis. 7. Characteristics of Udder Staphylococci.**—*Bull. Storrs agric. Exp. Sta.* No. 231. pp. 60. 15 tables. [Numerous refs.]

According to the authors, staphylococci can no longer be regarded merely as constituting the major part of the so-called " normal udder flora ". In many cases they are pathogenic and in most Connecticut herds they have been shown to be second in importance to *Str. agalactiae* as a cause of mastitis. They are responsible for lowering the quality of the milk and under certain conditions some strains produce a substance (enterotoxin) toxic to man. Although the form of mastitis caused by staphylococci is occasionally acute, the majority of cases studied was of a mild nature. The degree of pathogenicity of these organisms is usually

related to their ability to haemolyse ox-blood and to coagulate human blood plasma, and those not possessing these characters may be regarded as unimportant as a cause of mastitis. As a rule, staphylococci which are haemolytic and which cause a count of over 500,000 leucocytes per c.c. may be regarded as pathogenic. Compared with *Str. agalactiae* mastitis, staphylococcal mastitis is usually milder, but it cannot be controlled by segregation and replacement with first-calf heifers as in streptococcus infections. Animals tend also to recover more easily in staphylococcus infections, a point which raises the possibility that biological products may be of service in protective inoculation.

No cases of food poisoning by udder staphylococci had occurred amongst consumers of milk from two affected herds under observation, probably because the milk was efficiently cooled within half an hour of being drawn and all obviously abnormal milk discarded.—GWILYM O. DAVIES.

GAITANDJIEFF, G. (1939). Fütterungsmilzbrand bei Schweinen. [**Anthrax in Pigs**].—*Tierärztl. Rdsch.* **45.** 620-621. [7 refs.]

Feeding stuffs containing material of animal origin are often the source of anthrax in pigs, and in Bulgaria, where the use of such feeding stuffs is exceptional, anthrax in swine is rare. Two calves died of anthrax, and the meat, after mincing and steaming, was fed to some pigs. Five out of 78 adult pigs became infected and succumbed, while a number of young pigs were ill but recovered. Observation of the outbreak confirmed the fact that pigs may resist infection by anthrax-infected food, and suggested that pigs of less than four months are less susceptible than older pigs. [See also *V. B.* **7.** 509].—H. E. HARBOUR.

HEGYELI, Z. (1938). A Bac. anthracis virulentiájának fokozása és gyengitése táptalajokkal. [**Exaltation and Attenuation of *B. anthracis* in Culture**].—*Állatorv. Lapok.* **61.** 273-280. 16 figs. on 2 plates, 1 table.

In a description of four series of experiments H. shows how *B. anthracis* with decreased or lost virulence may be re-exalted to a good immunizing virulence without animal passage by multiple passages in suitable media. If the loss of virulence is not too great the strain may be re-exalted by passage through a fresh agar medium, ordinary broth or fresh blood agar. Further exaltation is achieved by media containing fresh liquor amnii, testicle extract, fresh white of egg or fresh serum. On the other hand attenuation may be produced by very numerous (100 and more) serial sub-cultures.

Two pages of excellent photographs illustrate the macroscopic and microscopic appearances of the colonies and bacteria.

TAKAHASHI, Y. (1939). Essai d'immunisation anticharbonneuse chez le cobaye et chez le lapin au moyen d'une variante non capsulogène mais oedematogène du *Bacillus anthracis*. [**Attempt at Anti-Anthrax Immunization in the G. Pig and Rabbit by means of a Non-Capsulated but Oedematogenic Variant of *B. anthracis*].—*C. R. Soc. Biol. Paris.* **132.** 163-166. 2 tables. [2 refs.]

Experiments, which are particularly interesting from both the immunological and the biological points of view, were carried out with a variant strain of *B. anthracis*. This variant is of the R type, does not possess capsules either *in vitro* or *in vivo*, and is non-pathogenic for the larger laboratory animals. When inoculated under the skin in g. pigs and rabbits in doses of 0·01 c.c. of a 24-hour broth culture, it provokes a remarkably extensive oedema of short duration, but has no further pathogenic effect. In the mouse, a dose of 0·0001 c.c. or even

0·00001 c.c. of a broth culture produces a wide-spread and continuing oedema, and although in this animal death follows in from 5-7 days, the bacillus cannot be recovered from the blood, liver or spleen.

Details are given of experiments in which g. pigs and rabbits were immunized with the variant and afterwards withstood a test inoculation with a virulent anthrax culture.

T. states that in *B. anthracis*, while there is a definite connexion between the possession of a capsule and the virulence of a strain, the antigenicity and the virulence are two distinct factors and have nothing in common.—J. R. Lawson.

Filipović, D. (1938). Rezultat tuberkulinisanja krava muzara u okolini Beograda god. 1938. [**Results of Tuberculin Tests of Dairy Cows in the Neighbourhood of Belgrade in 1938**].—*Arhiv. Minist. Poljopriv., Belgrade.* **5.** No. 13. 127-130. 5 tables. [French summary].

Some tuberculin testing (ophthalmic reaction) of dairy cattle in the neighbourhood of Belgrade is carried out, though not as part of any co-ordinated control scheme. During the period 1936-1938, F. tested 8,529 dairy cattle. The incidence of positive reactions on the farms varied from 0·72 % to 6·45 %, the average being 3·4 %. Regular tuberculin testing on a larger scale is required throughout Yugoslavia.—B. Oswald (Križevci).

I. —. (1938). Règlement de la campagne prophylactique de la tuberculose des espèces bovines laitières. [**Organization of the Control of Bovine Tuberculosis in Portugal**].—*Bol. pec., Lisboa.* **6.** 55-66. 3 maps. [In French].

II. —. (1938). Portugal. Règlement pour la campagne prophylactique de la tuberculose des races bovines laitières. [**Portugal : Regulations for the Campaign against TB. in Dairy Cattle**].—*Bull. Off. internat. Epiz.* **17.** 693-705.

I. A campaign to be applied to a particular area for twelve months is organized in advance. Arrangements are made for the collection of the non-milking cattle at certain centres, and the disposal of reactors at abattoirs. A preliminary inspection is made in the spring and a subsequent inspection of infected premises in the autumn.

All the cattle of the area are registered and branded with an identity mark on the horn, a cross being branded on suspected animals. A fee is payable by the owner for testing and registration, and is used by the local office to cover the expenses of the campaign. Veterinary authorities control the inspection of cowsheds and the hygiene of milk production.

A description is given of typical positive, doubtful and negative caudal fold tuberculin reactions. When less than 10 % of reactors are found in such an area, they are slaughtered, otherwise they are isolated. Calves from the reactors are separated and fed on milk from non-reacting cows ; milk from reactors can only be used after pasteurization. Regulations exist governing the movement of reactors by permit in such an area.

The method of disposal of reactors and the method of paying the compensation are discussed ; certain herds qualify for a bonus. The importance of brucella infection and mastitis is mentioned, and administrative details relevant to the campaign are given. Bulls are tested and examined annually.

II. This is substantially the same as I.—F. N. Manley.

ANON. (1939). El problema de la tuberculosis en la Republica Argentina. **[Tuberculosis in the Argentine].**—*Rev. zootéc.* **26.** 23-26.

In 1934 bovine TB. was reported on 24,512 farms as against 23,608 in 1933. Of 393,343 animals examined 22,180 were condemned according to the regulations in force. The increased number of cases reported is attributed partly to greater vigilance on the part of local authorities, partly to improved methods of diagnosis.

In rural districts, however, control is haphazard and often non-existent. A grave situation exists in many dairying districts, where it is not uncommon for tuberculous cattle condemned by one local authority to be sold to neighbouring districts where control is not enforced, the milk from infected cows frequently reappearing in the original district.

The amount of meat condemned on account of TB. in public abattoirs has risen greatly, *viz*, 3,694,728 kg. in 1931 as compared with 5,149,030 kg. in 1935 ; these figures contrast unfavourably with the totals of meat condemned for all other diseased conditions combined, *viz*, 273,801 kg. in 1931, as compared with 436,104 kg. in 1935. No figures are available from uncontrolled abattoirs. Whereas the European nations and the U.S.A. have reduced human mortality from TB. of bovine origin by one-half to two-thirds in the last 25 years, the figure in Argentina still remains at almost 200 per 100,000 inhabitants, that is to say, the figure prevailing in Europe at the beginning of the century.—J. PASFIELD.

FRITZCHE, K. (1939). Tuberkulose beim " Emu " (Dromaeus). **[Tuberculosis in the Emu].**—*Berl. Münch. tierärztl. Wschr.* June 9th. 361. 1 fig. [2 refs.]

Three emu chicks were reared at Breslau Zoological Gardens under approximately natural conditions. At about three months old all three birds showed swelling of the eyelids and slight corneal opacity ; a white, thick exudate was found inside the lower eyelid and a slight greyish-white discharge was present in both nostrils. P.M. examination of one bird showed pea-sized caseous tuberculous lesions on the bronchial mucous membrane and the serous membranes of the air-sacs, in the lungs, liver and spleen, and in the intestinal walls. Inoculation of g. pigs produced local lesions at the site of inoculation only. A typical avian growth was obtained on malachite-green egg medium. Similar lesions were observed in the other chicks ; no clinical evidence of TB. was found in the adult parent birds.—E. C. HULSE.

I. GRIFFITH, A. S. (1939). **The Susceptibility of the Golden Hamster (*Cricetus auratus*) to Bovine, Human and Avian Tubercle Bacilli and to the Vole Strain of Acid-Fast Bacillus (Wells).**—*J. Hyg., Camb.* **39.** 154-160. 9 figs. on 1 plate. [1 ref.]

II. GRIFFITH, A. S. (1939). **The Relative Susceptibility of the Field-Vole to the Bovine, Human and Avian Types of Tubercle Bacilli and to the Vole Strain of Acid-Fast Bacillus (Wells, 1937).**—*Ibid.* 244-259. 2 tables. [4 refs.]

I. All three types of tubercle bacilli were found to be virulent for the golden hamster. The bovine type was found to be the most virulent and, after subcutaneous inoculation, it gave rise to generalized tuberculosis, the lesions containing large numbers of tubercle bacilli. The human type was also highly virulent, but caseation was found to be less extensive than after infection with the bovine strain. The avian type did not give rise to macroscopic lesions, although multiplication of the bacilli occurred in the tissues and death resulted.

After infection of two hamsters with the vole strain of acid-fast bacillus, one, killed at 152 days, was in good condition, although tuberculosis-like lesions were

present in the liver and spleen. The second died in 188 days and showed similar lesions; numerous acid-fast bacilli were observed with no evidence of caseation.

II. The bovine type of tubercle bacillus was the most virulent for the vole. When injected subcutaneously or infected by feeding, progressive generalized TB. rapidly followed; infection with the bovine type was characterized by extensive caseation of the associated lymph nodes and enormous multiplication of bacilli. The human type was found to multiply in the tissues of the vole and cause death, although macroscopic tuberculous lesions were not generally produced in the tissues. Similarly the avian bacillus did not produce macroscopic lesions and there was less multiplication of bacilli than with the human type. The vole strain was found to infect the vole by cutaneous scarification as well as by inoculation and feeding. A progressive generalized disease was produced which was characterized by large accumulations of acid-fast bacilli in the areolar tissues of the thigh and axilla in its later stages. A comparison of the susceptibility of voles and g. pigs to human and bovine tubercle bacilli showed that generalized lesions appeared later in the vole, although death occurred in approximately the same time. It is suggested that the vole may be of value in the typing of tubercle bacilli and in confirming the typing of " bovine " strains which are comparatively avirulent for the rabbit.—E. C. Hulse.

Boquet, A., & Bequignon, R. (1939). Sur la dispersion du BCG dans l'organisme du cobaye. [**The Dispersion of BCG in the Body of the Guinea Pig**].—*C. R. Soc. Biol. Paris.* **131.** 578-581. 1 table. [1 ref.]

G. pigs were inoculated (subcut.) in the left plantar pad with 1 mg. of a 4-weeks potato culture of BCG. After intervals varying from 15 minutes to 200 days they were killed and the left popliteal lymph node, left inguinal and left lumbar lymph nodes together, part of the spleen, liver, and lung, with their associated lymph nodes, were ground up and sown on four tubes of Löwenstein's medium. The number of colonies developing in 4-10 weeks was tabulated. No invasion of liver, spleen or lungs occurred within the test period of 15 min.-200 days after inoculation. The three lymph nodes nearest the site of inoculation were involved in one hour and remained infective for 40-100 days.

The dose of BCG used conferred hypersensitivity to tuberculin and some immunity to superinfection with virulent *M. tuberculosis*. These reactions, therefore, seem due to diffusion of substances elaborated at the peripheral site of infection and not to generalization. This theory is supported by the fact that, if the cutaneous nodule was excised a short time after an intradermal inoculation of a similar dose of BCG—an interval of 24 hours to 8 days—the pre-allergic period was not prolonged and no decrease in sensitivity to tuberculin resulted.—C. V. Watkins.

Boquet, A. (1939). Caractères distinctifs du bacille bovin et rôle de ce germe dans l'infection tuberculeuse de l'homme. [**Distinctive Characteristics of the Bovine Type of the Tubercle Bacillus and the Role of this Organism in Human Tuberculosis**].—*Rev. Immunol.* **5.** 321-349. 4 tables. [Numerous refs.]

A detailed account is given of the differential morphological and cultural characters and metabolic activity of the human and bovine types of tubercle bacilli. Differences are described in their chemical constitution, antigenic structure, and allergic and anaphylactic properties. A comparative study is made of their pathogenicity for the monkey, g. pig, dog, rat, mouse, fowl, sheep, goat, horse, ass and calf, and for man. The virulence of both types of bacilli for the rabbit by various routes is contrasted in detail. The application of both types for vaccination is

summarized, and statistics are reviewed of the incidence of human infection with bovine type tubercle bacilli in Europe and North America as well as of the comparative incidence of both types of bacilli in human infection in France. After a discussion on the transmission of bovine type tubercle bacilli from animal to animal and from animal to man, B. refers in detail to the methods of isolating tubercle bacilli from milk, butter and cheese, with instances of the incidence of positive results.—R. O. Muir.

Schaefer, W. (1939). Propriétés antigéniques des bacilles tuberculeux bovins lisses et rugueux et des bacilles humains. Présence dans le sérum de lapin antibacilles bovins S d'un anticorps spécifique pour les protéides du bacille bovin. [**Antigenic Properties of Rough and Smooth Bovine Tubercle Bacilli and of Human Type Bacilli. Presence in Antiserum to the S Bovine Type of an Antibody Specific for the Proteins of the Bovine Type Bacillus**]. —*C. R. Soc. Biol. Paris.* **130.** 968-972. [7 refs.]

Rabbits were inoculated with suspensions of living or dead smooth strains of human tubercle bacilli; other rabbits were inoculated with rough or smooth bovine strains. The complement-fixation test was performed at intervals of 2-3 weeks. Lipoid and polysaccharide antibodies were demonstrated in serum prepared from the human strains or the R bovine strain, but no protein antibodies were observed. The S bovine strain yielded all three types of antibody. The antibodies reacted with the protein of bovine strains, but not with those of human strains. The bovine S antiserum contained a protein antibody specific for the bovine bacillus and another antibody reacting with the polysaccharides of both bovine and human bacilli.—E. C. Hulse.

Anon. (1939). **Is Bovine Tuberculosis Increasing?**—*Brit. med. J.* Nov. 11th. 962.

The Government's failure to pass the Milk Bill is deplored particularly as, owing to evacuation, probably more children are having to drink raw instead of pasteurized milk. A serious view of this is taken, as the 1938 report of the Cardiff Medical Officer of Health would appear to indicate that the incidence of TB. in cattle is increasing. In support of this, statistics are given of meat inspection condemnations and the percentage of tuberculous infection found in milk in Cardiff during recent years.—Gwilym O. Davies.

Oehnell, R. (1938). Ueber die Gefahr der Ansteckung mit Tuberkulose bei Anwendung von Talk zum Trocknen von Obduktionshandschuhen. [**Tuberculous Infection from Talcum Used to Dry Gloves Used for Necropsies**].—*Zbl. allg. Path. path. Anat.* **69.** 324-326. [4 refs.] [Copied *verbatim* from *Arch. Path.* **27.** 939-940. Signed George J. Rukstinat].

Dissemination of tubercle bacilli by talcum powder used to dry gloves worn at necropsies is reported. O. carried out his researches designated A and B, with observations as follows. At hospital A, from 8 to 9 bodies dead of pulmonary tuberculosis were examined each month. The attendants frequently washed their rubber gloves hurriedly with soap and water, then gave them a preliminary drying on a towel. Talcum sprinkled from a shaker was used to complete the drying and often was scattered in a cloud when imprisoned air was used to turn the gloves right side out. Guinea pigs placed within a meter of the tablet on which the excess talcum fell, developed widespread tuberculous lesions. Others exposed to talcum which had not come in contact with the gloves remained free from disease when kept about 10 meters from the tablet.

In hospital B, the gloves were powdered in a large glass cylinder kept in an antechamber of the morgue. Talcum was used repeatedly until the container was empty. Only from 1 to 2 bodies dead from tuberculosis were examined in this institution per month. Guinea pigs kept close to the talcum container remained healthy and had no tuberculous conditions *post mortem*. The studies indicate a possible source of tuberculous and other infections in man exposed to talcum dust contaminated by bacteria adherent to gloves used in morgues.

LUNDE, S. (1933). **The Epidemiology of Tuberculosis. Studies of the Occurrence and Modes of Spread of Tuberculosis in a Medical District in Norway.**—*Acta tuberc. scand.* **7.** 97-231. 15 tables, numerous charts. [In English]. [Abst. from Author's summary].

The manner of spread of TB. in human beings in an area in Norway was studied. No bovine TB. had been found in the district over a period of approximately 20 years. 20% of the people who had drunk raw milk from tuberculin-reacting cows as children 20 years before did not react to tuberculin. The highest TB. mortality among the inhabitants was found on those farms where there had previously been bovine TB.

—. (1938). **Discussion on Johne's Disease.** [Speakers: DUNKIN, G. W., HOPKIRK, C. S. M., MINETT, F. C., LAMONT, H. G., WATSON, E. A., WHITTY, J. D., OLVER, A., DATTA, S. C. A., DAUBNEY, R., LAIDLAW, P., & STABLEFORTH, A. W.]—*Rep. 1st Imp. vet. Conf. Lond., 1938.* pp. 68-77. [12 refs.]

MAJOR DUNKIN gave a brief survey of the incidence of Johne's disease in the United Kingdom and abroad, and a history of the work done on the production of johnin. He discussed the use of avian tuberculin as a means of pre-clinical diagnosis of Johne's disease; he considered it to be inferior to johnin as a diagnostic agent. It was suggested that the site of primary infection probably occurred in the pharyngeal and submaxillary glands and that the intestinal wall and its adjacent glands were the last areas to be involved. It was found that the potency of different brands of johnin varied considerably; the luxuriance of the cultural growth did not affect the potency of the johnin. It was sometimes difficult to obtain a sufficient number of infected animals for test purposes, and latterly goats sensitized by intravenous injections of large doses of culture had been used. For the treatment of infected pastures a dressing of quick lime (1-2 tons per acre) was recommended.

DR HOPKIRK stated that the disease was scheduled in New Zealand in 1932; positive reactors to the johnin test were slaughtered and the owners compensated. The johnin test was performed at six-monthly intervals; all imported cattle were tested with johnin.

PROFESSOR MINETT mentioned that the incidence of Johne's disease was found to be less in those herds which were regularly tuberculin tested; the possibility of cross-reactions to johnin in tuberculous animals had to be borne in mind.

DR WATSON stated that Johne's disease was controlled in Canada. Johnin was now prepared by ultra-filtration and precipitation of a synthetic medium growth.

CAPTAIN DATTA said that in India all breeds of cattle were affected as well as buffaloes, although in certain parts the disease appeared to occur only in goats. Coincident infection with tuberculosis and Johne's disease was fairly frequent. Clinical cases commonly occurred in which the organisms could not be demonstrated.—E. C. HULSE.

Bruner, D. W., Dimmock, W. W., & Edwards, P. R. (1939). **The Serological Classification of** *Corynebacterium equi*.—*J. infect. Dis.* **65.** 92-96. 2 tables. [5 refs.]

C. equi, a cause of pneumonia in foals, has little biochemical activity, is encapsulated, forms large moist colonies and produces a pigment. Similar bacteria have been isolated from aborted equine foetuses and from the genital tract of barren mares.

A serological examination of 20 cultures, with 8 cultures of related diphtheroids, gave results from which the following conclusions are drawn. *C. equi* possesses both species-specific and type-specific antigens. Extraction of the bacilli with acid and heat frees the type-specific antigens. The species-specific antigens may be recognized by complement-fixation tests after acid extraction of the bacilli; these antigens were not apparent in the diphtheroids used for comparison. The type-specific antigens may be demonstrated by agglutination tests and by precipitation tests in which the acid-extracts of the bacilli were used as the antigens. Of the 20 cultures studied 14 belonged to the two serological types, and cultures from the genital tract of mares, from aborted equine foetuses and from pneumonia lesions of foals belonged to the same type.

C. equi has been isolated from pigs, and one strain was recovered from the uterine discharge of a buffalo cow after abortion.—R. Lovell.

Olin, G. (1938). Tularämiepidemien i Gävleborg län år 1937. [**The Epidemic of Tularaemia in the County of Gävleborg in 1937**].—*Hygiea, Stockh.* **100.** 236-252. 1 fig., 1 map. [16 refs.]

Tularaemia was observed for the first time in Sweden in 1931, when 31 cases in human beings were recorded. A second outbreak occurred in 1934, affecting 48 persons. An epidemic occurred from July to October 1937 in the county of Gävleborg, in which 115 human beings contracted the infection; there were no deaths. O. describes the course of this epidemic, with particular reference to the source of infection and its mode of transmission. This part of the report is of special comparative interest.

The first three patients observed were known to have contracted the infection from a moribund hare, which was subsequently used as food for foxes on a ranch without any ill effect upon the foxes being observed. A fourth person who became infected had been handling rats, some of which had been found dead; the source of his infection was not established. In the remaining 111 cases no direct evidence was obtained concerning the source of infection.

Although it was not proved, O. considers that there was strong evidence that a common native species of mosquito served as a transmitter of the infection from infected rodents to human beings; this has also been suggested by American investigators. The periodicity of the epidemics in human beings as observed in Sweden (every three years) appears to coincide with epizootics among wild rodents of a particular district. When such epizootics occur in the insect season, transmission to man is possible and even probable.—Gustav Naerland (Oslo).

I. Buzna, D. (1938). A Bacillus suipestifer elöfordulása a sertések bélsarában évszakok szerint. [**The Presence of** *Salmonella cholerae-suis* **in the Faeces of Normal Swine**].—*Állatorv. Lapok.* **61.** 187-188. 1 table.

II. Hajdu, G., & Korzenszky, J. (1938). Vizsgálatok a lovak, szarvasmarhák és juhok bélsarának paratyphusbacillustartalmáról. [**The Presence of Salmonella in the Faeces of Horses, Cattle and Sheep**].—*Ibid.* 188-189.

I. An examination of the faeces of 5,612 healthy pigs coming from 404

different breeding establishments, conducted over a space of two years, showed that the number excreting *Salmonella cholerae-suis* was on an average 10%, but that this figure showed considerable variations according to season, the lowest figure being 6·6% in Feb. and the highest 19·9% in Dec. Peak figures were found between November and January, followed by a decline in February and March, a subsequent minor peak rising from April to May, and again falling in June, then low values in July and August, a further peak in September and a decline in October.

D. believes that climatic changes combined with seasonal changes in feeding may account for this fluctuation.

II. Examination of the faeces of 1,000 healthy horses showed the presence of *Salmonella typhi-murium* in 3 instances only; of 800 head of healthy cattle *S. typhi-murium* was found in only 5 instances, while in 220 healthy sheep the organism was not found in the faeces in any instance. *S. enteritidis* was not found in any animal examined.

The authors conclude that in Hungary paratyphoid carriers are very rare, and this is in agreement with the fact that paratyphoid affections are rarely observed in animals belonging to the three groups mentioned above.

MEYER, K. (1938). Relation de l'antigene Vi aux autres facteurs antigéniques des *Salmonella*. [**Relation of the Vi Antigen to the Other Antigenic Factors of Salmonella**].—*C. R. Soc. Biol. Paris.* **129.** 485-486. [8 refs.]

M. refers to previous work in which he has produced evidence to show that the different factors characterizing the somatic antigens of salmonella are united in a single molecule, of constant composition, and are not independent of each other.

Working with a strain of *Salmonella suipestifer* containing the somatic antigens VI and VII, and the Vi antigen, he concluded that the Vi antigen is not linked to other antigenic factors. He points out that this conclusion, formed by using serological methods, confirms that reached by BOIVIN and MESROBEANU [*V. B.* **9.** 252].—A. A. B. ELLIS.

VAN GOIDSENHOVEN, C., & SCHOENAERS, F. (1939). Sur les propriétés biochimiques de *Salmonella pullorum*. [**Biochemical Properties of** *S. pullorum*].—*C. R. Soc. Biol. Paris.* **130.** 1340-1342. [14 refs.]

Biochemical reactions of 48 strains of *S. pullorum* are given. All the strains were stated to be serologically identical. [*S. gallinarum* cannot be separated from *S. pullorum* serologically].

The fermentation of laevulose, mannite, glucose and arabinose occurred in all strains tested. All failed to ferment lactose, saccharose, " melibose ", raffinose, " melezitose ", starch, inulin, erythritol, adonitol, salicin, amygdalin, arbutine and " α methyl-d-glucoside ".

Maltose and dulcite were fermented by 29 out of 48 strains tested. [This suggests the inclusion of 29 *S. gallinarum* strains]. Other irregular fermentations were as follows :– only 3 strains out of 37 fermented dextrin, 11 strains out of 48 fermented xylose, 6 strains out of 12 fermented trehalose, 34 strains out of 48 fermented sorbite and 46 out of 48 fermented rhamnose.

Certain strains are said to have been gas producing, but no correlation between such reactions and fermentations is mentioned.—C. V. WATKINS.

TURNER, P. R. (1939). **A Few Observations on Bovine Pasteurellosis.**—*Vet. Rec.* **51.** 530-532.

T. regards " transit fever " in cattle as a condition separate from pasteurellosis and has written his article in these terms. He discusses the clinical picture of the

condition which he considers to be pasteurellosis and which he has seen in the United Kingdom. Characterized by a wide range of degrees of intensity, from mild conditions with slight temporary fever, occasional cough and precarious appetite to severe cases of haemorrhagic septicaemic nature, the disease is often mistaken for transit fever.

He discusses the differentiation of the condition from strongylosis and poisoning by *Ranunculus celeratus*.

Ber, A. (1938). Blut- und Temperaturuntersuchung bei mit Bangbazillen infizierten Meerschweinchen und Kaninchen. IV. Mitteilung. Das Blutbild bei infizierten Tieren. V. Mitteilung. Temperaturuntersuchung bei infizierten Tieren. [**Investigations on the Temperature and Blood Picture of Brucella-Infected G. Pigs and Rabbits. IV. The Blood Picture of Infected Animals. V. The Temperature of Infected Animals**].—*Arch. int. Méd. exp.* **13.** 411-426 and 427-436. 17 tables. [Numerous refs.] [In German] [See also *V. B.* **5.** 475, and **7.** 61, 212, 370 and 580].

IV. Normal and splenectomized g. pigs were injected with *Br.a.* In nine normal animals the number of neutrophile leucocytes rose during the first hour after injection. After 24 hours the numbers of other polymorphonuclear leucocytes and lymphocytes had also risen. The latter remained high during the period of examination (one month), but the leucocytes returned to normal after a few days. In 11 splenectomized g. pigs increase in polymorphs was greater and lasted longer than in normal animals, but the increase in lymphocytes was delayed for some days.

V. The temperature curves of normal g. pigs vary between 38·8°C. and 39·9°C. When injected intraperitoneally with *Br.a.* the temperature rises between the 6th and 48th hour and then falls by lysis.

When splenectomized g. pigs are infected the temperature reaches higher levels and remains high for longer. Rabbits have a normal temperature of between 39°C. and 39·9°C. When infected, the temperature rises during the first 24 hours, but returns to normal by the 48th hour.—P. S. Watts.

Velu, H., & Zottner, G. (1939). Innocuité et efficacité des vaccins antibrucelliques lanolinés, enrobés vivants. [**Innocuity and Efficacy of Brucella Live Vaccines Coated in Lanoline**].—*Bull. Acad. vét. Fr.* **12.** 116-120. 2 tables. [7 refs.] [Also appeared in *Maroc méd.* **19.** 122-124].

In view of the difference of opinion which has been expressed regarding the effect on *Br. abortus* of suspension in oily excipients, the authors have studied its viability when suspended at a concentration of 0·25% in various oily mixtures composed of lanoline, liquid paraffin and lycopodium powder, and kept at incubator temperature, room temperature and in the cold respectively. Viability was found to depend firstly on the proportion of lanoline and secondly on the temperature.

When suspended in 50% lanoline no growth was obtained on subculture after 8 hours at 37°C., or 20°C., or after 48 hours at 3°C. When suspended in 25% lanoline no growth was obtained after 24 hours at 37°C., 2 days at 20°C., or 5 days at 3°C. When suspended in 10% lanoline no growth occurred after 7 days at 37°C., 12 days at 20°C., or 15 days at 3°C.

The authors prefer to use an excipient containing 25% lanoline because it is convenient to handle and acts reasonably quickly. They use a dose of 5 mg. [presumably for sheep] in 1 c.c. of the excipient, and state [no details are given in this article] that it gives a valuable degree of immunity and, being dead, is safe.
—A. W. Stableforth.

I. Davoli, R. (1938). Recherches sur le soi-disant antigène complet de Brucella mélitensis et Brucella abortus. [**Research on the Complete Antigen of Brucella**].—*Boll. Sez. ital. Soc. int. Microbiol.* **10.** 124-128. 3 tables. [15 refs.] [In French].

II. Pop, A., Damboviceanu, A., Marinov, I., & Barber, C. (1939). Sur les caractères biologiques des antigènes complets extraits des *Brucella*. [**Biological Character of Complete Brucella Antigens**].—*C. R. Soc. Biol. Paris.* **130.** 1336-1338. [1 ref.]

I. Chemical fractionation has so far been of little help in differentiating the several types of brucella. Polysaccharide, nucleoprotein, S substance, and glycolipid all react with antisera of the various types. The glyco-lipid was studied with a view to a possible differentiation of the serological characters of *Br. abortus* and *Br. melitensis*. The strains employed were examined for H_2S production and growth on dye media. The method of extraction differed only in slight details from that of Boivin and Mesrobeanu [*V. B.* **7.** 187]. The extract of complete antigen precipitated antiserum prepared from both *Br.m.* and *Br.a.* and also the sera of patients infected with *Br. m.* Absorption of the sera with extract reduced the quantity of agglutinins independently of the antigen employed. Brucella deprived of the extract were agglutinated by the various antisera, although to a lower titre, but this may have been due to incomplete extraction. D. concludes that the neutralization of antibodies by the complete antigen does not reveal the presence of other antibodies specific to either type of brucella.

II. The experiments were performed with extracts of the three types of brucella, the extracts being obtained by Boivin and Mesrobeanu's method. All extracts were toxic to mice in doses of 0·1-0·2 mg. intraperitoneally, but *Br. suis* was the most toxic. The toxicity of *Br. suis* extract for g. pigs and also for rabbits was still more marked. The inoculation of the extracts into g. pigs and rabbits was followed by hyperglycaemia and some rise of temperature. In complement-fixation tests the extracts were very active. 0·1 c.c. of a 1:2,000 dilution fixed the complement in the presence of a dilution of 1:25,000 of antisera for any type of brucella. In allergic reactions performed on g. pigs and rabbits there was little difference between the results with the types of extract employed when the dilution was 1:2,000. A dilution of 1:10,000, however, gave a specific reaction with the homologous antigen and little or none with the heterologous extracts.—S. J. G.

Preuner, R. (1939). Ueber ein gramnegatives, bewegliches, durch Bangsera agglutinierbares Bakterium. [**A Gram-Negative, Motile Bacterium, Agglutinable by *Brucella abortus* Antiserum**].—*Zbl. Bakt. I.* (*Orig.*). **143.** 351-359. 3 figs., 2 tables. [Numerous refs.]

P. describes an organism with unusual characteristics isolated from the blood of a human patient with typical undulant fever. The organism was a small ovoid Gram-negative, weakly motile organism with one polar flagellum, non-capsulated and non-sporing and moderately polymorphic. It grew equally well aerobically or anaerobically, and with or without serum, forming smooth, round, glossy colonies which became distinctly yellowish after two or three days ; it was non-haemolytic and did not liquefy gelatin, was soluble in sodium taurocholate, indole positive, gave acid and clot in litmus milk, and formed acid and gas in arabinose, xylose, rhamnose, dextrose, galactose, laevulose, maltose and mannitol, but not in saccharose or lactose.

The organism was agglutinated by the patient's serum and also by a *Br. abortus* serum. Reciprocal absorption tests showed however that whilst the new organism and *Br. abortus* had an antigen in common, their main antigens were distinct,

neither being able to abort the homologous antibodies from the serum prepared with the other.

Further cultural and serological details are given in the article itself.—A. W. S.

COBURN, D. R., & QUORTRUP, E. R. (1938). **The Distribution of Botulinus Toxin in Duck Sickness Areas.**—*Trans. 3rd N. Amer. Wildlife Conf., 1938.* pp. 869-876. Washington : American Wildlife Institute.

The authors have demonstrated that slime and ooze can and do act as culture media for the production of botulinus toxin. With few exceptions, however, organic matter of animal origin must be present for toxin formation in the field. Vegetable debris alone is insufficient for production, and indeed, appears in most cases to exert an inhibitory influence upon the activities of the organism.

The greatest losses of wildfowl from botulism are incurred in seasons of drought followed by heavy rainfall. During the drying period intense bacterial activity occurs in the exposed silt and slime. Annelids, crustaceans, and aquatic insect larvae which are trapped and killed, form a nucleus of animal matter and promote the conditions necessary for production of toxin. Heavy rainfall subsequently spreads the toxin. Increase in disease thus occurs parallel with rainfall, especially when precipitation exceeds 0·2 inches.

As illustrations of the ubiquitous nature of the botulinus menace, a number of typical duck-sickness areas is described. In each case the circumstances conform with those detailed above.—D. D. OGILVIE.

RYLE, J. A. (1938). **Bacteraemia.**—*Lancet.* **235.** 867-871. 2 tables. [7 refs.]

It is now recognized that bacteria enter the bloodstream much more commonly than was formerly supposed and it has become necessary to distinguish between septicaemic and non-septicaemic bacteraemia.

Temporary bacteraemia followed by localization is the only reasonable explanation of the origin of most deep-seated staphylococcal and coliform infections. In a considerable proportion of cases the pneumococcus may be obtained by blood culture in the early stages of pneumonia, and it is highly probable that the meningococcus reaches the cranial cavity by way of the bloodstream. Within a few minutes of the extraction of teeth from a septic mouth, bacteraemia due to *Str. viridans* has been demonstrated in many cases. The value of blood culture in diagnosis is stressed, and it is suggested that more positive results would be obtained if samples were taken before the pyrexial peak.—JOHN FRANCIS.

SULLIVAN, N. P., & MANVILLE, I. R. (1938). **The Relationship of the Diet to the Self-Regulatory Defense Mechanism. I. Hydrogen-Ion Concentration and Bacterial Flora.**—*Amer. J. digest. Dis.* **5.** 428-432. 1 fig., 3 tables. [16 refs.] [Authors' summary copied *verbatim*].

The addition of dehydrated apple to the diet of the rabbit gives results similar to those obtained by other workers using fruit. The animals receiving apple had an increased hydrogen-ion concentration in the intestinal contents. The intestinal flora was changed from one in which Esch. coli predominated to one in which the acidophilic type of organism was dominant. Furthermore, the number of gas-producing organisms was considerably reduced. The addition of apple to the diet of both rabbits and rats for a period of 42 days did not alter the cellulose splitting flora of either of these groups.

I. SULLIVAN, N. P., & MANVILLE, Ira A. (1937). **Relationship of the Diet to the Self-Regulatory Defence Mechanism. II. Lysozyme in Vitamin A and**

in Uronic Acid Deficiencies.—*Amer. J. publ. Hlth.* **27.** 1108-1115. 5 tables. [Numerous refs.] [For Part I see preceding abstract].

II. Anon. (1938). **Lysozyme and the Bowel.**—*Brit. med. J.* May 21st. 1111-1112. [3 refs.]

I. The lysozyme determinations of the tissues of five levels of the intestinal tracts of rabbits showed that the colon contained many times more lysozyme than the other levels, but its lysozyme titre could not be increased beyond normal levels by feeding a dehydrated apple supplement. The tissue lysozyme concentration of vitamin A deficient and uronic acid deficient rabbits was considerably increased but returned to normal when the rabbits were given an apple supplement. [The apple does not contain a large amount of vitamin A but is rich in uronic acids.] Similarly these two groups of animals lost by mucus secretion only 6-17% of their tissue lysozyme when stimulated by pilocarpine, while normal rabbits and other groups deficient in vitamin A and uronic acid but fed an apple supplement, lost 50% by mucus secretion when thus stimulated. From these results the authors conclude that vitamin A and uronic acids act as trigger mechanisms in the secretion of lysozyme in mucus; animals deficient in these two factors can still produce lysozyme in their tissues but are unable to use it as a defence mechanism.

The method for estimating lysozyme is described.

II. A very brief annotation on lysozyme is given. The possibility that deficiency of lysozyme may be a factor in chronic infections of the colon and other mucous surfaces is discussed.—R. Allcroft.

I. Oag, R. K. (1939). **The Growth of** *Borrelia duttoni* **in the Developing Egg.**—*J. Path. Bact.* **49.** 339-344. 2 figs. on 1 plate, 1 table. [7 refs.]

II. Oag, R. K. (1939). **Growth of** *Borrelia duttoni* **in the Developing Chicken Embryo. [Correspondence].**—*Nature, Lond.* **143.** 808. [1 ref.]

I. *B.d.*, the organism responsible for African relapsing fever, was propagated through the developing chick embryo; four serial passages are recorded. The viability of the organism recovered from the egg was proved by mouse inoculation. Inoculation of this organism into the fertile egg neither killed the embryo nor produced any macroscopical change in the chorio-allantoic membrane. The infection of the embryo appeared to be through blood invasion. Allantoic fluid collected free from blood from the inoculated eggs contained no organisms, but the blood from the embryo revealed numerous organisms. Reference is made to a similar work on the cultivation of *Leptospira icterohaemorrhagiae.*

II. An abbreviated version of I.—S. G. Iyer.

DISEASES CAUSED BY PROTOZOAN PARASITES

Richardson, U. F. (1938). **Protozoan Diseases of Stock.**—*Proc. R. Soc. Med.* **31.** 1302-1304. [8 refs.]

In areas in which diseases due to the intracellular protozoa (coccidia, babesia and theileria) occur, young animals contract an infection which is often symptomless and usually remain immune throughout life. Susceptible adult animals introduced into infected areas contract an acute disease. Sheep in Britain all appear to carry coccidial infection and so also do some 90% of rabbits. Work on immunity to coccidiosis is briefly referred to. In cattle rinderpest causes breakdowns to coccidia and babesia infections. In babesia infection of dogs persistent infection maintains resistance and, if the parasites are completely eliminated, immunity is lost in a few weeks. A possible explanation is that these diseases are diseases

of the cells and not of the host and immune cells become more abundant as susceptible cells are killed by the parasites.

In trypanosome infections an initial infection of natural hosts is often non-clinical. Immunity may perhaps be broken down by the formation of relapse strains which are not susceptible to antibodies. It is believed that game in a "fly belt" develop quite a serviceable immunity by the process of infection in youth followed by repeated reinfection. In dealing with trypanosome immunity the greatest difficulty is to decide whether a given animal is free from residual infection or not. At the present time there seems to be a possibility that solid immunity may be reached through recovery followed by repeated reinfection in youth. Such a process may produce a lysin which is capable of dealing with any relapse strains before the animal is too mature to make an efficient resistance.

—S. J. Gilbert.

Pavlov, P. (1939). Résistance des spirochètes et des trypanosomes dans le sang défibriné à la température ordinaire. **[Viability of Spirochaetes and Trypanosomes in Defibrinated Blood at Ordinary Temperature].**—*Ann. Parasit. hum. comp.* **17.** 262-263.

One group of defibrinated g. pig blood samples infected with *Trypanosoma evansi* and *Treponema duttoni*, and another with *Tryp. equiperdum* and *Treponema duttoni*, at room temperature, was examined by Giemsa stained smears and mouse inoculation. This revealed that the spirochaetes lived longer than the trypanosomes; that the former did not prevent the development of the latter was shown by attempts at maintaining the three parasites separately.—M. L. Bingham.

Hoare, C. A., & Bennett, S. C. J. (1938). **Morphological and Taxonomic Studies on Mammalian Trypanosomes. VI. Further Observations on the Absence of the Kinetoplast in** *Trypanosoma evansi*.—*Parasitology*. **30.** 529-542. 1 fig., 2 tables. [7 refs.]

The isolation of another akinetoplastic (= ablepharoplastic) strain of *T. evansi* from a camel in the Sudan is recorded, the strain breeding true on subinoculation into camels, horses, donkeys and gerbils, and appearing to possess normal pathogenicity. A second strain of *T. evansi* in which akinetoplastic forms varied in number from zero to 71 % was investigated, but the conditions affecting the fluctuation in the number of trypanosomes lacking this organ remain obscure. From an analysis of the fluctuating strain it would appear that the variation in the proportion of akinetoplastic trypanosomes depends on the irregular division of normal trypanosomes resulting in akinetoplastic forms, on the rate of reproduction of normal and aberrant trypanosomes, and on the mortality rate of the different types. It is considered that akinetoplastic strains probably arise in nature either through the inoculation by the insect vector of new hosts with trypanosomes lacking the kinetoplast, or through the strain becoming totally akinetoplastic within the host. The theory that the kinetoplast is an organ of mitochondrial origin concerned with the production of glycogen is discussed, and it is suggested that the apparent disappearance of this organ may be due to functional disturbance, as the result of which the kinetoplast ceases to produce glycogen and is invisible by the usual methods of staining.

—U. F. Richardson.

Corson, J. F. (1939). **The Infections Produced in Sheep and Antelopes by a Strain of** *Trypanosoma rhodesiense*.—*Trans. R. Soc. trop. Med. Hyg.* **33.** 37-46. 3 tables.

A strain of *Trypanosoma rhodesiense* maintained for experiments on its

retention of infectivity for man, was passaged through over 70 sheep. All these animals seemed to harbour the trypanosome infection till they died. The only sheep surviving at the time of writing the article were those infected late in 1938 or early in 1939 ; all the earlier animals died, presumably as the result of trypanosome infection, in periods varying from 40-322 days. Though the acuteness of infection varied from host to host, it remained apparently constant during the four years of maintenance. The same strain was used to infect eland, Thomson's gazelle, reedbuck, duiker, bushbuck, impala, dikdik and steinbok. Whilst some of the animals died, apparently as the result of infection, others recovered and appeared to cease to harbour trypanosomes. Others resisted infection.—U. F. R.

Duke, H. L. (1939). **Remarks on Dr. Corson's Paper** [*J. trop. Med.* (*Hyg*). **41.** 262.] **on the Infectivity of** *T. rhodesiense* **to Man.**—*Trans. R. Soc. trop. Med. Hyg.* **33.** 127-130. [4 refs.]

D. discusses the importance of game as a reservoir host for *T. rhodesiense*, and emphasizes that mammalian hosts appear to vary in their influence on the infectivity of the trypanosomes. He disputes Corson's suggestion [*V. B.* **9.** 693.] that negative transmission experiments have little value, and suggests that although they may not indicate complete loss of infectivity they may indicate some modification. He draws attention to the variation in the susceptibility of human beings, and to his own results, in which he found that passage of infection from monkeys to man was more regular than from buck. He criticises one of Corson's conclusions on the ground that infection of the volunteer concerned might have occurred in a previous experiment, as human infections may sometimes escape detection unless sub-inoculation of their blood is resorted to.—U. F. Richardson.

Nowicki, E. (1939). Postmortales infektionsfähiges Ueberdauern von Schizotrypanum cruzi Trypanosoma congolense und Trypanosoma equinum in Versuchtstierorganen. **[The Duration of Infectivity of** *Tryp. cruzi*, *Tryp. congolense*, **and** *Tryp. equinum* **in the Organs of Experimental Animals after Death of the Host].**—*Zbl. Bakt. I.* (*Orig.*). **143.** 385-392. 3 tables. [4 refs.]

N. was able to infect mice with liver, spleen or heart blood emulsion collected one day after the death of an animal infected with *Tryp. cruzi*, but not with material collected two days after death. With brain emulsion he was able to infect regularly after two days and occasionally after three days. He was not able to infect rats with *Tryp. congolense* or *Tryp. equinum* with any material taken from an infected animal one day after death. Whether material was kept at room temperature or in the ice chest the persistance of infectivity after the death of the host remained the same. It is pointed out that *Tryp. lewisi* in liver retains its infectivity for three days after death, and it is suggested that in the case of the pathogenic trypanosomes, the loss of infectivity may be due to trypanocidal substances produced by the host, which are able to kill the trypanosomes when their vitality is reduced by the death of the host.—U. F. Richardson.

Brutsaert, P., & Henrard, C. (1938). L'hémoculture comme moyen auxiliaire de diagnostic de la maladie du sommeil. **[Blood Culture as a Method of Diagnosis of Sleeping Sickness].**—*C. R. Soc. Biol. Paris.* **127.** 1469-1472. [1 ref.]

The culture medium was made by adding 2 c.c. of citrated human blood to tubes containing 2-2·5 c.c. of Ringer's solution (0·6 % sodium chloride) or Tyrode solution, and was tested for sterility by incubating at 37°C. for 24 hours. If citrated infected blood was used for inoculation, cultures were rarely successful

and then only if the blood used was swarming in trypanosomes. When Roche's fluid (1% polyanetholsulphonate of soda) was substituted for sodium citrate, which is normally used for taking blood samples, it was found that successful cultures were obtained even when the seed blood was poor in trypanosomes. 0·5 c.c. of a mixture of five parts of blood to one of Roche's fluid was used for inoculation, and cultures were incubated at 25-28°C. Successful cultures were made from human, canine and porcine cases of infection with organisms of the *brucei-gambiense* type, even when other methods of diagnosis only revealed infection after repeated examinations.—U. F. Richardson.

Christensen, J. F., & Porter, D. A. (1939). **A new Species of Coccidium from Cattle, with Observations on Its Life History.**—*Proc. helminth. Soc. Wash.* **6.** 45-48. 1 fig.

The oocysts were recovered from the faeces of a young Jersey calf. They had a rough, heavily-mammillated wall and when fed to a susceptible calf the walls of the oocysts recovered from this test animal varied from heavily-mammillated to perfectly smooth. The unsporulated oocysts measured from 32-45·5μ long by 20-25·5μ broad. The wall was 1-1·5μ thick, smooth, homogeneous, transparent and of a brownish-yellow tint. In unstained preparations the micropyle was seen as a thin, pale area over the narrow end, while in specimens stained with an iodine-eosin mixture in physiological saline solution, it was seen as a definite gap in the wall, covered by a black line which was assumed to be the operculum. Structurally, the wall varied from the usual transparent, homogeneous type to an unusual semi-transparent, heavily-mammillated type. The smooth type of wall predominated. The elevations appeared on the wall as yellowish granules embedded in a homogeneous matrix which was seen to form an irregular lattice-work over the surface of the oocyst in stained preparations. Complete sporulation of freshly expelled oocysts occurred in from 48-72 hours at room temperature. The protoplasm in the oocyst was not organized into a definite residual body, but residual material was seen as rounded masses or single granules scattered along the inner lateral margins of the sporozoites. To determine the pathogenicity of the oocysts, 8,000 two-months-old sporulated oocysts were administered to a two-weeks-old calf. Twenty-four days after infection 319,000 oocysts were seen in each c.c. of once-strained faecal sediment. The oocyst count gradually dropped until the 24th day of infection, when it was 7,500. No severe symptoms were seen in the calf apart from a profuse, watery, green diarrhoea accompanied by apathy which lasted from the 9th till the 13th day after infection. The name suggested for the new species is *Eimeria auburnensis*, as the parasite was discovered in Auburn, Alabama, U.S.A.—A. L. Wilson.

Horton-Smith, C., & Taylor, E. L. (1939). **The Efficiency of the Blowlamp for the Destruction of Coccidial Oöcysts in Poultry-houses.**—*Vet. Rec.* **51.** 839-842. 4 tables. [1 ref.]

The experiments were carried out to ascertain the efficiency of the blowlamp in disinfecting poultry houses contaminated by coccidial oocysts. One of the chief difficulties was the collection of oocysts after flaming, and to overcome this, an organism, *Chromobacterium prodigiosum*, was chosen, the flame-resisting powers of which were ascertained by experiment to be approximately the same as that of the oocysts. One second's exposure to the blowlamp flame killed both the bacteria and the oocysts, but on a rough surface they occasionally survived flaming for half a second. To kill all the *Chr. prodigiosum* painted on a clean rough board one foot square, exposure to the flame for more than 20 seconds was necessary. On a

similar board the bacteria, painted on in a thin film of faeces, survived 70 seconds' flaming and more than 100 seconds' flaming was necessary to kill all the *Chr. prodigiosum* present on a square foot of smooth wood, rough wood, zinc or asbestos if damp. The disinfection of a poultry house 20 feet long by 12 feet broad would therefore take from 2 to 16 hours to complete, so that the blowlamp must be regarded as a very inefficient means of sterilizing large surfaces.—A. L. Wilson.

Gavrilov, W., Bobkoff, G., & Laurencin, S. (1938). Essai de culture en tissus de "*Plasmodium gallinaceum*" (Brumpt). [**An Unsuccessful Attempt to Cultivate** *Pl. gallinaceum*].—*Ann. Soc. belge Méd. trop.* **18.** 429-434. [1 ref.]

All attempts to cultivate *Pl. gallinaceum* by inoculating infected heparinized blood into developing hen's eggs, into cultures of non-heparinized blood and with embryonic extract of spleen, marrow, mesenteric and muscular tissue, failed. The parasites could be maintained, however, in bone-marrow derived from infected birds, and were capable of survival for 10 days at 37-38°C., in adult and embryonic marrow. Heparinized and defibrinated blood, kept at the same temperature, was, however, non-infective after five days. The plasmodium remained infective for 21 days in defibrinated blood kept on ice, whilst heparinized blood kept under the same conditions was infective for 5-10 days, but lost its virulence after three weeks.
—M. L. Bingham.

Bishop, Ann, Tate, P., & Thorpe, Mary V. (1938). **The Duration of** *Plasmodium relictum* **Infection in Canaries.**—*Parasitology.* **30.** 388-391. 1 table. [6 refs.]

The literature on the subject is reviewed. Although it is considered that chronic infections with *Pl. relictum* persist throughout the life of the infected birds, there is not sufficient experimental evidence to warrant this view. The authors have proved by means of experiments continued over several years that chronic infections with *Pl. relictum* in canaries may persist in the peripheral blood up to eight years and three months after the primary infection, and the blood of such birds has been shown to be infective for healthy canaries for the same period.
—S. G. Iyer.

Shortt, H. E. (1938). **Protozoal Parasites Enquiry at King Institute, Guindy, Madras, 1937.**—*Rep. sci. Adv. Bd Ind. res. Fund Ass., 1937.* pp. 84-86.

Transmission of *Babesia gibsoni* by *Hyalomma bispinosa* was shown to occur from larvae bred from infected ticks and also from stage to stage of development. In the transmission experiments a very large number of ticks had to be used before obtaining infection, development probably taking place only in a few ticks.

Dogs infected with *B. canis* and cured by treatment with trypanblue were later reinfected with the same organism both by blood inoculation and bites of ticks, and showed complete absence of immunity.—S. J. Gilbert.

Kotlán, S. (1938). Előfordul-e hazánkban a juh-piroplasmosis? [**Does Piroplasmosis Occur in Sheep in Hungary?**].—*Állatorv. Lapok.* **61.** 443. [3 refs.]

As *Rhipicephalus bursa* does not occur in Hungary, reports of cases of ovine piroplasmosis [no details] lead K. to surmise that, should these reports prove correct, some other tick, possibly *Ixodes ricinus* or a *Hyalomma*, may act as intermediate host, in which case the piroplasmosis infestation may be due not to *Babesia ovis* but to some other species of piroplasm. This is important in view of the difference in sensitivity to drug treatment of the various piroplasms.

BAUMANN, R. (1939). Die kleinasiatische Schaftheileriose. [**Ovine Theileriasis in Asia Minor**].—*Berl. Münch. tierärztl. Wschr.* July 28th. 469-474. 9 figs. [Numerous refs.]

A review is given of the classification of piroplasms and of the records of piroplasm infections in sheep, four species being recognised, *Piroplasma ovis* (=*Babesia motasi*), *Babesiella ovis* (=*Babesia ovis*), *Theileria recondita* (synonym *Th. sergenti*), and *Th. ovis* (synonym *Th. hirci*.) The two theileria are distinguished in that *Th. recondita* is described as non-pathogenic and blue bodies are produced in the host in detectable numbers only when the infection is complicated by other diseases or by splenectomy, whilst *Th. ovis* is pathogenic and blue bodies are present in considerable numbers.

A brief review is given of the symptoms and lesions described in connexion with the various piroplasmoses of sheep, and then B. turns to his own observations on a flock of 484 sheep infected with *Th. ovis* in Turkey. [Judging from the illustration of the organisms it seems probable that there was a concurrent infection with *B. ovis*]. The carcasses were emaciated, and subcutaneous oedema of the dependent parts and head was relatively constantly present. Petechial haemorrhages were present in the subcutaneous, submucous and subserous tissues, and the lymph nodes in all cases were haemorrhagic, enlarged and oedematous. The spleen was considerably enlarged, the pulp being dark red and the Malpighian corpuscles prominent. The liver and kidneys were enlarged and pale in colour. Only in three cases was there any jaundice or haemoglobinuria. The blood appeared to be light red and watery.

Histologically the spleen tissue and lymph nodes showed hyperaemia and the deposition of haemosiderin in the endothelial cells. The liver cells showed cloudy swelling ordinarily, but in cases with haemoglobinuria, there was lymphocytic infiltration and deposition of haemosiderin, giving a picture similar to that seen in equine infectious anaemia.—U. F. RICHARDSON.

NIESCHULZ, O., & BOS, A. (1939). Een verder geval van bartonellainfectie bij een rund. [**A Case of Bartonella Infection in a Calf**].—*Tijdschr. Diergeneesk.* **66.** 252-254. 1 fig. [6 refs.] [English, French and German summaries].

In an investigation into piroplasmosis a calf in Holland was infected with bovine blood containing *Babesia bigemina* and *Anaplasma marginale* which had been received from Surinam. 56 days later a heavy infection with *Bartonella wenyoni* was found in the blood of the calf. This organism was, however, not observed in five other calves similarly inoculated. The authors believe therefore, that it may occur naturally in Dutch cattle.

It is possible that this bartonella is identical with *Eperythrozoon wenyoni* [*V. B.* **9.** 534].—JAC. JANSEN (UTRECHT).

LAWKOWICZ, W. (1939). **Researches on** *Bartonella muris* **and its Cultivation** *in vitro*.—*Trans. R. Soc. trop. Med. Hyg.* **32.** 601-604. 4 figs. on 1 plate. [6 refs.]

Two strains of *B. muris* were cultured *in vitro* on a modified semi-solid Noguchi medium, and their characters and morphology were studied. The original material was obtained from the blood of splenectomized adult rats. Apparently all adult rats are naturally infected, since bartonellosis was produced in all cases after splenectomy; 3-weeks-old rats on the other hand are free from infection, as neither bartonellosis nor anaemia occurred after splenectomy. Experimental anaemia and bartonellosis could be produced, however, in 3-weeks-old rats by inoculation of young cultures. There is some evidence of an antigenic relationship with *Rickettsia*.—M. L. BINGHAM.

DISEASES CAUSED BY VIRUSES

SMITH, W. (1939). **The Action of Bile Salts on Viruses.**—*J. Path. Bact.* **48.** 557-571. 4 tables. [Numerous refs.]

Attempts to aid the spread of influenza virus in mouse lungs by the action of sodium deoxycholate showed that this salt rapidly inactivates the virus. Further experiments indicated that several viruses (gradocol filtrates) were susceptible to this salt and, to a less degree, to sodium apocholate.

In the case of influenza virus the action, which was irreversible, was almost instantaneous and occurred with dilutions of the salt up to 1:2,000. Other viruses which were susceptible were louping ill and Rous sarcoma, whereas vaccinia and ectromelia were completely resistant. The organism of contagious bovine pleuropneumonia and the filterable sewage organisms of Laidlaw and Elford were also rapidly cleared, provided the suspensions were not too opaque.

A description is given of the dark ground changes which take place when these organisms are lysed by bile salts. No evidence of bile-resistant strains was obtained nor was the phenomenon due to an autolytic ferment enhanced by the addition of the bile, such as is believed to explain the bile solubility of pneumococci.

Experimental animals, which were injected with virus suspensions inactivated by bile salts, showed no evidence of immunity.—R. E. GLOVER.

BIRAGO, D. (1939). Le bétail du Macina et la peste bovine. [**Rinderpest in Macina, French Sudan**].—*Bull. Serv. zootech. Epiz. A.O.F.* **2.** No. 2. 1-4. [5 refs.]

Rinderpest is endemic in Macina, a country where much cattle movement and periodic collection of stock goes on, and nearly all animals become infected when calves. Figures are quoted which show that the greatest mortality is amongst calves of 4-6 months (just after weaning); in this age-group mortality reaches 78·31%, while mortality for all affected animals is given as 35·5%. Infection is said by the author to be maintained chiefly by a few young animals which are thought to receive antibodies in the milk of previously infected mothers, gaining a partial immunity and later contracting a chronic subclinical form of the disease. It is stated that these may act as reservoirs of infection for considerable periods.
—H. E. HARBOUR.

PANISSET, L. (1939). La fièvre aphteuse. L'origine et les progrès de l'épizootie actuelle. Ses dommages : leurs causes et leur évaluation. [**The Origin of the Present Outbreak of Foot and Mouth Disease in France and the Losses Caused by It**].—*Cah. Méd. vét.* **9.** 125-135. 4 figs., 2 tables. [3 refs.]

A description, illustrated by maps, of the spread of F. & M. disease in France in the recent outbreak which began there in May, 1937. In March 1939 there were still 84 departments affected.

The actual monetary loss suffered by the country is estimated at one thousand million francs, and the indirect loss at about four thousand million, a total of five thousand million francs. As an example, figures for part of the department of the Aisne are quoted. The loss was assessed at just over one million francs, for a livestock population of only 2,570 cattle, 4,500 sheep and 54 pigs.—J. E.

LÜCK. (1939). Die Bekämpfung der Maul- und Klauenseuche (MKS.) in Ostpreussen mit Riemser MKS.-Vakzine nach Waldmann und Köbe. [**Control of Foot and Mouth Disease in East Prussia with the Riems Vaccine**].—*Berl. Münch. tierärztl. Wschr.* Aug. 4th. 485-494. 25 figs. [4 refs.]

This is the fourth detailed report of the use of the Riems vaccine on a large

scale in Germany. The vaccinations were applied by the " Ringimpfung " plan between June 1938 and April 1939, beginning at the time when the disease broke out seriously in many parts of Germany and in neighbouring countries. A total of 500,000 cattle and 50,000 sheep and goats on 36,800 farms were vaccinated, though it appears that over twice as many animals should have been vaccinated according to the original plan of campaign ; the cause of this was an inadequate supply of the vaccine during the first few months.

It is claimed that, although the disease spread to hundreds of farms, the vaccinations considerably reduced the morbidity and formed an effective barrier so that the greater part of East Prussia escaped invasion by F. & M. disease. The observations were confirmed of earlier reports [*V. B.* **9.** 83, 767.] to the effect that immunity becomes effective from the 14th day after inoculation and that it lasts for 9-12 months.—J. E.

Prat, J. (1939). Quelques observations sur l'utilisation à titre préventif, du sang total d'animaux convalescents de fièvre aphteuse (hémoprévention). [**Immunization against Foot and Mouth Disease by Convalescent Whole Blood**].—*Rev. Méd. vét., Toulouse.* **91.** 272-278. 1 table.

Whole blood from animals recovered from F. & M. disease, collected 12-15 days after the febrile stage, and given in doses of 2·5 c.c. per kg. body-weight, was used as a prophylactic agent in the field. It is claimed that considerable protection was afforded by this means (of 122 adult cattle, 74 were completely and 43 slightly protected ; of 96 pigs, 94 were completely protected). All control animals were affected [numbers not cited].

No evidence of therapeutic value was adduced.—E. O. Longley.

I. King, L. S. (1938). **Studies on Eastern Equine Encephalomyelitis. I. Histopathology of the Nervous System in the Guinea Pig.**—*J. exp. Med.* **68.** 677-691. 17 figs. on 4 plates. [10 refs.]

II. King, L. S. (1939). **Studies on Eastern Equine Encephalomyelitis. II. Pathogenesis of the Disease in the Guinea Pig.**—*Ibid.* **69.** 675-690. 9 text figs., 2 figs. on 1 plate, 1 table. [9 refs.]

III. King, L. S. (1939). **Studies on Eastern Equine Encephalomyelitis. III. Intraocular Infection with Fixed Virus in the Guinea Pig.**—*Ibid.* 691-704. 4 figs. on 1 plate, 4 tables. [7 refs.]

I. The neuropathological features of Eastern equine encephalomyelitis are recorded in detail, and the histogenesis of the disease process is described. Only nervous system findings are reported.

Two different types of lesion occur. One is characterized by an inflammatory reaction in which neuronal damage may be negligible, and the other by a degeneration in which inflammatory changes are insignificant. Advanced cases of the former type show damage to the neurones proportional to the degree of exudation.

Following peripheral inoculation the first detectable change in the nervous system is an intravascular accumulation of leucocytes, accompanied by proliferation of the tunica adventitia. These changes, together with a circumscribed focus of polymorphonuclear leucocytes, constitute a typical lesion. Such lesions appear in early cases before the onset of clinical symptoms, and are scattered irregularly throughout the gray matter, especially in the neo- and olfactory centres.

After intracerebral inoculation the inflammatory changes are much less marked. Primary destruction of the neurones occurs, however, and involves especially the hippocampus and neo-cortex. The latter change is ascribed to a non-specific reaction of specially vulnerable tissue.

II. The virus of Eastern equine encephalomyelitis, injected peripherally, readily invades the blood stream and subsequently the central nervous system. The exact mode of entry into the nervous system, however, is unknown. An attempt was made, therefore, to elucidate the problem by peripheral, intranasal, and intraocular inoculation of g. pigs with virus. The animals were destroyed before the onset of symptoms and a topographical analysis of the lesions was made by serial sectioning of the brain. Nine cases are recorded in detail.

The distribution of the lesions was found generally to occur at random. It is concluded, therefore, that the mode of entry of the virus is directly from the blood stream into the nervous tissue. In isolated cases affected regions can be shown to be linked together by close anatomical relationships. Such distribution can only be explained by the assumption that the neuro-anatomical connections play at least a minor part in the spread of the virus. The frequency of lesions in the neo-cortex, with intact subcortical centres, however, indicates that nerve spread *per se* is of little moment.

III. Although the spread of a recently isolated strain of virus injected into the eye is inconstant, it has been found that an entirely constant behaviour follows the use of a fixed strain. The phenomenon was studied by the intraocular inoculation of g. pigs. It was found in these subjects that general susceptibility to intraocular injection lay midway between the lethal intracerebral and the relatively inocuous peripheral routes, and further, that fixed virus must act for at least 10-13 hours in order to induce a fatal infection. Such virus can be recovered and demonstrated by sectioning in successive optic centres before it can be detected in the non-optic portions of the brain. The primary distribution follows the nervous pathways of the optic system closely. Neuronal necrosis is not marked, and the first and predominating reaction in the visual centres is inflammatory. Virus placed in contact with the retina produced an insignificant, non-specific reaction which was unaccompanied by ganglion-cell necrosis unless in the presence of a complicating intraocular infection.—D. D. Ogilvie.

Hetyéssy, I. (1939). Adatok a lovak járványos agy-és gerinovelőgyulladásához. [**Equine Encephalomyelitis**].—*Állatorv. Közl.* **36.** 19-20.

A brief clinical description of encephalomyelitis in horses. [It is not clear whether this is the virus disease or not].

Papp, G. (1938). Lovak járványos, vérömléses (agy-) és gerincvelőgyulladása. [**Equine Encephalomyelitis**].—*Állatorv. Lapok.* **61.** 309-314. [8 refs.]

This is the case history of an outbreak of the disease affecting 12 horses from the same stable, which all sickened within a period of 26 days at intervals of 10-12 days.

P. identifies the disease on purely clinical grounds as the American equine encephalomyelitis; he excludes Borna disease owing to the absence of cerebral symptoms, and suggests that many cases described as equine enzootic paraplegia may be equine encephalomyelitis.

Grosso, A. M., & Prieto, C. (1938). " Estudio sobre el valor antigénico del virus formalado de la encefalomielitis ". [**Antigenic Value of Formolized Encephalomyelitis Virus**].—*Inst. Enferm. Infecc., Univ. B. Aires.* **1.** No. 2. 3-19. 7 tables.

In the preparation of the vaccine, colts of 5-7 months of age were inoculated intracerebrally with standardized virus from g. pigs, of which the M.L.D. was 0·1 c.c. of a 1:14,000 suspension injected intra-lingually into healthy g. pigs of

200-300 g. The colts were destroyed in the acute stage and a 20% suspension of nervous tissue was prepared, formolized, and filtered through four thicknesses of gauze, and incubated for 48 hours at 37°C. The vaccine was compared in g. pigs with 1936 Argentine vaccine from acute natural infections, to which it proved superior, and also with Lederle bivalent chick-embryo vaccine, to which it was equal in strength. G. pigs inoculated (subcut.) with a single dose of 2 c.c. of the new vaccine survived 100 M.L.D., and 50% of g. pigs so inoculated resisted 500 M.L.D. Following a single intralingual inoculation of 4 c.c. of vaccine, two out of three resisted 2,000 M.L.D. Immunity was established four days after inoculation and reached its height on the eleventh day. The author speaks of having compared the vaccine with an antirabies vaccine.—J. PASFIELD.

I. MANNINGER, R. (1938). Fertőzési kísérletek a lovak fertőző kevésvérűségének ragályanyagával. [**Experimental Infection with the Virus of Equine Infectious Anaemia**].—*Állatorv. Lapok.* **61.** 341-342. [Translated in *Arch. wiss. prakt. Tierheilk.* **73.** 452-427].

II. KÖBE, K. (1938). Die Uebertragung der infektiösen Anämie des Pferdes auf das entmilzte Ferkel. [**Transmission of E.I.A. to Splenectomized Piglets**].—*Arch. wiss. prakt. Tierheilk.* **73.** 399-408. 2 figs. [9 refs.]

III. PARNES, J. (1938). Beitrag zur Vielgestaltigkeit des klinischen Bildes der Infektiösen Anämie der Pferde. [**Variability of the Clinical Picture of E.I.A.**]—*Tierärztl. Rdsch.* **44.** 473-476.

IV. BOLLE, W. (1939). Makroskopische Befünde an der Pulmonalarterie bei Einhufern mit infektiöser Anämie. [**Changes in the Pulmonary Artery in Horses with E.I.A.**]—*Arch. wiss. prakt. Tierheilk.* **74.** 94-98. 4 figs. [2 refs.]

V. HALTENHOFF, R. (1939). Beitrag zur hämatologischen Differentialdiagnose der ansteckenden Blutarmut der Einhufer. [**Haematological Differential Diagnosis of E.I.A.**]—*Ibid.* 85-93. [Numerous refs.]

I. M. attempted artificial infection through the intact skin in two horses, by means of bandages, impregnated with infective blood and urine respectively, tied on to the fetlocks. The horse with the urine-infected bandage developed the disease after 25 days; the other, with the blood bandage, on the 39th day. The result shows the danger of bedding soiled with urine. Two other horses were submitted to infection with one dose of 1,500 c.c. of defibrinated blood for the one and, for the other, the same quantity of urine given by a tube into the pharynx, to ensure an intensive contact of the virus with the mucosa of that organ. The horse infected with urine developed the disease on the 19th day, the other, infected with blood, on the 39th day. If a sufficient amount of virus is given, repeated infections are not necessary. In both experiments the urine proved more virulent than the blood.

II. E.I.A. was transmitted (intraven. or subcut.) to splenectomized piglets of 4-6 weeks of age and passaged five times. Blood of horses in the pyrexial stage caused high fever and anaemia in such piglets after an incubation period of 3-5 days. Blood taken during afebrile periods is not always infective; blood taken at the beginning of the disease infects such piglets more easily than blood from horses at a later stage. Control experiments were undertaken to show the influence of splenectomy upon the body temperature and the number of erythrocytes, the influence of normal horse blood upon splenectomized piglets, the influence of the virus upon non-splenectomized piglets of the same age, and to exclude the physiological anaemia which occurs normally in piglets under the age of three weeks and which is due to the change from foetal to postfoetal blood cells. Splenectomy

facilitates the infection with the virus. In the author's opinion further experiments are necessary to determine whether the inoculation of splenectomized piglets is a suitable test for practical use in the diagnosis of E.I.A.

III. P. states that five different clinical types of E.I.A. can be distinguished. The septicaemic form is characterized by continuous fever and pronounced anaemia; death occurs after 14-20 days. This course tends to occur when very robust animals become infected.

The cardiac form has the symptoms of cardiac asthma and is due to the cardiotropism of the virus. The clinical picture is characterized by an acute dyspnoea, cardiac insufficiency, pulmonary congestion, and possibly emphysema. The erythropenic or anaemic type leads to dyspnoea through destruction of the erythrocytes; there is an intermittent rise in temperature, with an accentuation of symptoms at night, subnormal temperatures in the morning, increased action of the heart and in the later stage emphysema of the lungs.

The muscular type is characterized by acute disturbances in the muscles, leading to inco-ordination of the movements (ataxia); fever and anaemia are also present. The lymphatic type is due to lymph stasis with swelling of the lymph nodes, inanition and stupor. Large oedemas develop and the mucosae contain petechiae.

The last type consists of cases affected with virus of low virulence; the course is relatively mild and recovery is said to occur after a protracted convalescence.

IV. Past work has shown that more than 80% of horses affected with E.I.A. have typical lesions of the heart. B. ascertained that 30% of such horses show similar changes in the pulmonary artery, such lesions being more frequent in males and in young animals. They consist either of lipoid infiltration or of solid protuberances of the intima wall, are variable in form, usually of a nodular character, and may be smooth or ribbed. The lesions are visible with the naked eye. Lipoid infiltrations were found in 66% of the cases, the other type in 34%. The most usual site of the lesions was the bifurcation of the artery. The initial part of the pulmonary artery and its peripheral branches revealed changes relatively seldom.

V. Blood counts were made on 12 horses affected with different severe diseases with the object of comparing the results with the usual blood picture in E.I.A. From the diversity of the results it is concluded that the blood picture in the latter is not of value for differential diagnosis.—V. Chládek (Prague).

Feldmann, L. (1937). Untersuchungen über den Virusgehalt des Speichels von mit ansteckender Blutarmut behafteten Pferden. [**Virus Content of the Saliva of Horses Affected with Equine Infectious Anaemia**].—*Inaug. Diss., Hanover.* pp. 51. 24 charts. [Numerous refs.]

Nakamura, N., Ishii, S., & Watanabe, S. (1938). Étude sur le virus de l'anémie contagieuse du cheval. Observations expérimentales sur la répartition du virus dans plusieurs organes au cours de formes évolutives non fébriles de la maladie. [**Distribution of the Virus of E.I.A. in the Organs during the Non-Febrile Stages of the Disease**].—*Bull. Off. internat. Epiz.* **16.** 149-160. Discussion pp. 390-392. [Reprinted in *J. Jap. Soc. vet. Sci.* **17.** 50-63 of pt. 2].

I. Assuming that the virus of E.I.A. can be demonstrated by its pathogenicity for rabbits, an account is given of experiments, in which these animals were injected subcutaneously or intrarectally with the blood serum or the saliva of 6 horses, 4 of which were believed to be affected by E.I.A. The results are claimed by F. to have shown that the virus may be present in the saliva of affected horses.

The results of experiments on Korean ponies, stated to be susceptible

to inoculation with E.I.A. virus, are claimed to have shown variations in the distribution of the virus in the internal organs during the different stages of the disease. The constant and abundant presence of the virus in bone-marrow would suggest its specific affinity for the " mesenchyme-reticulo-endothelial " system of the marrow. The virus does not multiply in blood, the latter merely serving as a vehicle. Even when absent from the blood, the virus may be present in the central nervous system and the endocrine organs. Histological lesions are usually present in the spleen, liver, and lymph nodes. The amount of virus contained by the lymph nodes is very variable. The virus is present for the longest time in the kidneys, and it is excreted in the urine.

ZOFIJEVSKY, V. (1939). Ueber die Intensität der durch grössere Virusdosen bei der Simultanimpfung gegen die Schweinepest entstehenden Immunität. **[Intensity of Immunity Caused by Large Doses of Virus in Simultaneous Inoculation against Swine Fever]**.—*Z. InfektKr. Haustiere.* **54.** 302-311. 4 tables. [5 refs.]

Z. concludes from four series of experiments in which 6, 10, 13 and 13 pigs respectively were used, that the intensity of the immunity conferred by the serum-simultaneous method of protection against swine fever is in no way dependent on the size of the dose of virus, and that it is the expression of a qualitative and not a quantitative process. A certain lowering of the strength of the immunity can be recognized experimentally when massive test doses are used, but this occurs irregularly, and occurs alike whether normal or large amounts of virus are used during immunization. The doses of virus blood used during the process of immunization varied from 0·1 c.c. to 100 c.c.; the test dose was 100-150 c.c., given 19 days later in the first two experiments and a month later in the other two.

Z. has previously reported [see *V. B.* **9.** 769.] that the amount of virus used in immunization has no effect on the duration of the immunity as regards small test doses, and whilst he did not carry the observations now recorded beyond one month, he takes the view that the results would have been similar if the tests had been carried out at a longer interval after immunization.—A. W. STABLEFORTH.

WEBSTER, L. T. (1937). **Epidemiologic and Immunologic Experiments on Rabies.** —*New Engl. J. Med.* **217.** 687-690. [Also appeared in *N. Amer. Vet.* **19.** No. 6. 25-30].

This is a general discussion of studies on rabies. The inoculation of mice intracerebrally is claimed to be a more reliable method of diagnosing rabies than the demonstration of Negri bodies in the brain of the suspected animal. Brain tissue from suspected cases is injected into albino mice of a strain with a high susceptibility to neurotropic viruses; they become paralyzed and die within 10 days. Of 200 field specimens reported negative after examination for Negri bodies, 15-20% proved positive to this test, revealing the presence of atypical cases and of apparently healthy carriers. Neither virulent nor non-virulent vaccines were effective in the treatment of infected mice even when given immediately following the inoculation of virus. Vaccination with virulent virus, however, was effective as a prophylactic measure if carried out at least seven days before exposure; no harmful effects were noted following vaccination. With phenol vaccines there seemed to be a point in the destruction of the virus at which no virulence could be detected, and yet some immunizing power remained. W. refers to a new tissue culture vaccine which is being developed, and suggests that canine vaccination should be deferred until a preparation of proved effectiveness is available.

Sulkin, S. E., & Willett, J. C. (1939). **A Comparative Study of the Mouse and Guinea Pig Inoculation Methods in the Diagnosis of Rabies.**—*Amer. J. publ. Hlth.* **29.** 921-926. 4 tables. [6 refs.]

As a result of comparative tests on g. pigs and mice the authors state that the latter are more reliable for the diagnosis of rabies. The results were checked against examination for Negri bodies of the brains of the suspected, as well as of the test animals.

In positive cases mice give fewer false negative results than g. pigs and die after a shorter interval, thus making the diagnosis more speedy.

For a reliable diagnosis the symptoms in mice are valueless. Negri bodies should be sought in their brains from the 8th or 9th day after inoculation, or at death, a few days later.—J. E.

Rita, G. (1939). Essais d'infection expérimentale de l'embryon de poulet en voie de développement avec le virus rabique fixe. [**Experimental Infection of Chicken Embryo with Fixed Rabies Virus**].—*Boll. Sez. ital. Soc. int. Microbiol.* **11.** 20-26. [17 refs.] [In French].

In a series of eight experiments with developing embryos ranging from 9-15 days old, and inoculated with the fixed virus of the anti-rabies institute, Rome, the authors were unable to obtain any evidence of the multiplication of the virus. Serial transmission was attempted to the 4th, 5th or 6th passage, tests of the virus being made in either rabbits or g. pigs at each passage. In two instances the virus was still viable after the six-day period of incubation, but in no instance later than this.

No macroscopic lesions were evident on the chorio-allantoic membranes, and no Negri bodies could be recognized microscopically. These negative results are in accordance with the findings of the majority of other workers.—E. O. Longley.

Bridré, J., & Krassnoff, D. (1939). Dimensions approximatives des formes filtrables du microbe de l'agalaxie contagieuse. [**Approximate Dimensions of the Filtrable Agent of Contagious Agalactia**].—*C. R. Soc. Biol. Paris.* **131.** 974-976. [2 refs.]

Reference is made to the findings of Elford to the effect that the organism of bovine pleuro-pneumonia passes through collodion membranes of minimum pore-diameter 0·350μ in its visible forms, and 0·200μ in its invisible forms, the estimated sizes of the two forms being 170-250 mμ and 100-150 mμ respectively.

The authors conducted experiments on similar lines, filtering cultures of three strains of the organism of agalactia through filters ranging from 1-0·05μ, the criterion of filtrability being growth in cultures of the filtrate.

In one experiment where microscopic examination of the culture revealed only filamentous forms, the filtrate was sterile at all pore-diameters below 0·95-1·0μ. In all other instances the organism passed through membranes of pore-diameter 0·53-0·56μ, and in three instances of 0·33-0·35μ; the latter was also the end-point of the control contagious bovine pleuro-pneumonia cultures. All were negative below this.

It is adduced that the filtrable forms of the organism of agalactia are 160-250 mμ in size, and comparable with the pleuro-pneumonia organism.—E. O. Longley.

Kimura, R., & Masunaga, N. (1939). Ueber Isolierung und Züchtung des Hühnerpestvirus. [**Isolation and Culture of Fowl Plague Virus**].—*Zbl. Bakt. I. (Orig.).* **143.** 165-168. 3 tables. [8 refs.]

Fowl plague virus passaged in fowls lost virulence, so that the M.L.D. of the 42nd passage was 10^6 times that of the 12th passage.

In the virus passaged in egg embryos the virulence increased. The virus was also grown in tissue culture. Antiserum was prepared by hyperimmunizing fowls and was found to be capable of neutralizing the virus *in vitro*.

—Sassenhoff (Münich).

Kraneveld, F. C., & Nasoetion, A. (1938). Het virus van de in Nederlandsch Indië voorkomende pseudovogelpest (eerste mededeeling). [**The Virus of Newcastle Disease in the Dutch East Indies**].—*Ned.-ind. Bl. Diergeneesk.* **50.** 356-361. 1 table. [13 refs.] [English and German summaries].

The authors were unable to infect mice intracerebrally with any of 25 strains of Newcastle disease virus from various parts of the Dutch East Indies (Java, Celebes, Sumatra) in spite of the fact that maximal tolerable amounts of very virulent material were given.

Fowl plague strains obtained from Holland and Switzerland, however, proved to be pathogenic for mice. The Newcastle disease virus of the Dutch East Indies is different therefore on this point from fowl plague virus. Whether this difference will remain in future is uncertain as the character of the virus is inconstant; during the first four years that the disease occurred in that part of the world the virus was only demonstrable in saliva, faeces, brain and egg-yolk. At the end of 1931 it was also demonstrable in the blood and organs so that the resemblance to fowl plague became greater.—Jac. Jansen (Utrecht).

I. Stefanopoulo, G. J., & Nagano, Y. (1938). Essais de sérothérapie contre la fièvre de la vallée du Rift ou hépatite enzootique. [**Serum Treatment of Rift Valley Fever**].—*Rev. Path. comp.* **38.** 1169-1176. 6 tables. [10 refs.]

II. Stefanopoulo, G. J., & Nagano, Y. (1938). Sur la vaccination contre la fièvre de la vallée du Rift. [**Vaccination against Rift Valley Fever**].—*Ibid.* 1297-1301. 2 tables. [13 refs.]

I. Immune sera against Rift Valley fever virus were prepared in rabbits and monkeys. They prevented infection with certainty when given to mice from 15 days to one hour in advance of the virus, or simultaneously with it. If small doses of serum followed the virus the protective action was uncertain even after one hour, but larger doses were capable of arresting the spread of infection in a number of cases.

II. Mice inoculated firstly with the virus and later with a large amount of immune serum, possessed a solid immunity against 100-200 M.L.D. of virus, provided that the interval between the initial injection of virus and serum was not less than 36 hours.—R. E. Glover.

Tappeiner, S. (1938). Zur Frage der vakzinalen Aetiologie der Melkerknoten. [**Vaccinia Virus as the Cause of Milkers' Nodules**].—*Wien. klin. Wschr.* **51.** 1061-1062. 1 fig. [Numerous refs.]

A short account of a milker's nodule in the thumb of a farm worker. The cause was diagnosed as true vaccinia by means of a positive rabbit cornea inoculation test, Guarnieri bodies being observed in this tissue.—J. E.

I. Salaman, M. H. (1938). **Further Studies on the Combination of Vaccinia with Anti-Vaccinial Serum: The Action *in vitro* of Neutralizing Antibody on the Elementary Bodies.**—*Brit. J. exp. Path.* **19.** 192-203. 7 tables. [20 refs.]

II. Yoffey, J. M., & Sullivan, E. R. (1939). **The Lymphatic Pathway from the Nose and Pharynx. The Dissemination of Nasally Instilled Vaccinia Virus.**—*J. exp. Med.* **69.** 133-141. 4 tables. [Numerous refs.]

I. Vaccine elementary bodies suspended in citric-acid : disodium-phosphate buffer, were treated with antiserum, using tenfold dilutions of virus and a constant amount of serum. The amount of virus inactivated, as judged by the intradermal inoculation of rabbits, depended on the quantity originally present, and this seemed to follow the " percentage law " for the inactivation of the virus. By using sera with good virus-neutralizing but negligible agglutinating power, it was found that the direct inactivating effect was independent of agglutination. The reduction in infectivity persisted after all free serum had been removed from the mixtures.

II. Vaccine virus was instilled intranasally into rabbits, cats and monkeys in order to determine whether it spread from the nasal mucosa to the lymph stream. The presence of virus was detected by inserting cannulae into the cervical and thoracic lymph ducts, collecting the lymph, and testing intradermally in rabbits. No virus was found in the glands or lymph of the monkey or cat, but it was constantly present in the rabbit from the 12th hour to the 7th day after inoculation. The latent period probably represented the time taken for the virus to establish itself in the nasal mucosa. Experiments on centrifuged samples of lymph suggested that the virus was " fixed " by the lymphocytes.

The hypothesis is advanced that the lymph nodes do not present a barrier to the passage of the virus. It is also suggested that perivascular accumulations of lymphocytes, which are so common in many virus diseases, are not a reaction to the infective agent (the usual interpretation) but the actual method whereby viruses are introduced to the tissues.—R. E. Glover.

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

Simmons, S. W. (1939). **Some Histopathological Changes in the Skin of Cattle Infected with Larvae of Hypoderma Lineatum.**—*J. Amer. vet. med. Ass.* **95.** 283-288. 18 figs. [4 refs.]

This parasite causes injuries to the skin in various ways :- (1) by extensive inflammation which initiates a destructive necrosis ; (2) through débris collected in the skin ; (3) by the production of abscesses adjacent to, but not at, the site where the larva is located, and (4) through isolation by fibrous tissue of larvae which have died without penetrating the skin. Epidermal repair begins when the skin is penetrated, and though external repair may be completed in a fortnight, complete cicatrization may require three or four weeks. Excessive débris in the skin may extend this latter period. In the skin sections examined by S. cellular infiltration was extensive, most of the cells being plasmocytes. Eosinophiles and neutrophiles were relatively scarce. Cysts containing larvae killed by insecticides are slower to heal than those cysts from which the larvae have escaped normally.—A. L. W.

I. Wiebringhaus, H. (1937). Ueber die bei der amtlichen Dasselbekämpfung 1936/37 im Kreise Hannover-Land gemachten Erfahrungen. [**The 1936-37 Official Campaign against Ox-Warble Flies in the District of Hanover**].—*Inaug. Diss., Hanover.* pp. 48. 4 figs. [Numerous refs.]

II. Bartels, D. (1938). Ueber den Stand der Bekämpfung der Dasselfliege. [**The Warble Fly Situation**].—*Tierärztl. Rdsch.* **44.** 315-319. 2 figs., 7 tables.

III. Bartels, D. (1938). Welche Gaue Deutschlands sind am stärksten von der Dasselfliegenplage befallen ? [**German Districts Most Severely Attacked by Ox Warble Flies**].—*Ibid.* 437.

IV. Bartels. (1938). Die Verordnung zur Durchführung und Ergänzung des Gesetzes zur Bekämpfung der Dasselfliege vom 19.4.1937 und die Durchführung des Dasselgesetzes im Regierungsbezirk Schleswig im Jahre 1937. [**Germany : Order on the Carrying out of the Law For the Control of Warble Flies, 19th April, 1937, and Warble Fly Control in Schleswig in 1937**].—*Berl. tierärztl. Wschr.* March 25th. 169-171. [1 ref.]

V. Spann, J., & Pedretti, L. (1938). Dasselbekämpfungsversuche in Bayern 1938. [**Control of Ox Warbles in Bavaria in 1938**].—*Berl. Münch. tierärztl. Wschr.* November 4th. 669-674.

VI. Pedretti, L. (1938). Zur Bekämpfung der Dasselplage 1937 in Oberbayern und im Allgäu. (Ganzbehandlungsversuche am Höhenvieh) [**Ox Warble Control in Upper Bavaria and Allgäu, in 1937**].—*Münch. tierärztl. Wschr.* **89.** 26-33. [4 refs.]

I. W. emphasizes the importance of warble control in reducing the great losses due to hide damage, retarded development of young stock, and reduction of milk yield. Warble control measures in other countries are briefly reviewed. The warble control laws of Germany (1933) and their application up to 1936 are discussed in detail. Methods of control are considered, preference being expressed for treatment with derris-wash.

The campaign in Hanover in the years 1936 and 1937 is detailed, district by district. " Derrisol " and " derrilavol " were used, treatment being applied in April while cattle were still housed, and again in June where necessary. The June inspection and treatment presented some difficulty ; methods used for rounding up and control of cattle are described. In 1936, 28·2% of 7,668 cattle were found affected and were treated. In 1937, this figure had fallen to 17·2%. In older cattle, a greater proportion was found to harbour mature larvae in the skin of the back in June than in April, and it is suggested that in the thicker skin of older cattle the mature larvae, in course of the final migration, have to travel further ; they are thus not exposed until later to the action of larvicides applied externally.

II. The chief points of the 1937 warble control law of Germany are detailed. Widespread foot and mouth disease and lack of training facilities for warble control personnel prevented the application of this Order in 1938 and the campaign in that year was in the hands of the owners themselves. The pest causes an estimated annual loss of twenty million marks to butchers and tanners in Germany. Instructional propaganda proved useful in Schleswig-Holstein and is to be extended to other districts.

Abattoir and hide-auction statistics are discussed in detail. The incidence is still high and systematic annual treatment over wide areas will have to be continued.

Analysis of the monthly returns showed that in 1937 the highest incidence was usually in July and August, indicating the need for the second dressing in June (which is to be compulsory under the new law) [see IV]. The highest incidence was in hides offered for sale in September and October (10·5% and 11·2% for the whole of Germany), the lowest for those sold in March (2·1%).

III. A recapitulation and discussion of some of the figures mentioned in II.

IV. Warble attack, as judged by the numbers of damaged hides, fell from an average of 21% in 1934-35 to 12% in 1936. It remained to be seen whether this fall was actually a result of the application of the Warble Control Law of 1933. The new law came into effect in 1938. It provided that the personnel carrying out the compulsory dressings would be chosen and trained by the Veterinary authorities, under whose instructions they would work. The first dressing would be followed by an inspection 4-6 weeks later and a further dressing where

necessary. The law obliged owners to permit the warble control workers to enter their premises and to offer to assist them.

In Schleswig, in 1937, the general incidence had decreased. 273,282 animals were treated and 34,193 received a second dressing. Deaths from " warble anaphylaxis ", consequent upon treatment, were observed in one area. Double dressings with standardized derris preparations are recommended. Mechanical methods are only feasible when dealing with lightly affected animals with thin skins.

V. Further experiments on the efficacy of various derris-washes are detailed, similar results to those in previous years being obtained. Trials were also carried out with injections of hydrogen peroxide and of " derrophen " into the warbles. A syringe with a contrivance for automatically regulating dosage was used, and 0·25 c.c. was injected into each warble. With 12% hydrogen peroxide results were good, but the older chitinized and pigmented larvae tended to remain unaffected, presumably because the nosepiece of the instrument would not necessarily penetrate into the larva itself. Using 2% " derrophen " in the above instrument (half the strength employed as a wash), larvae in all stages were killed. The method is economical and effective. With experience the treatment takes no longer than the wash method. It is doubtful, however, whether an animal affected with a large number of warbles (100 or more) could resist the toxic effects of the drug injected. This point requires further investigation.

The effect of dry-brush massage was studied, and it is suggested that it was of some value [see VI].

VI. The average effectiveness of four commercial derris preparations was 91·4%, individual variation being negligible. Experiments on the effect of massage on the development of the warbles are detailed. Vigorous rubbing for five minutes with a dry brush had an appreciable lethal effect on the larvae ; a rubber massaging-roller was slightly less effective. Results with a wet brush used in conjunction with a soap solution or with 20% salt solution were much better, and in the latter case 46·5% of larvae were killed (658 warbles on 57 cattle). Results were better in fine-skinned animals. P. suggests that the effectiveness of larvicide washes is in part due to the rubbing-in of the solution, and stresses the value of thorough daily grooming during the winter months.—H. E. Harbour.

Baranov, N. (1938). Prilog poznavanju prirodnih neprijatelja golubačke mušice iz klase insekta. **[On the Natural Insect Enemies of the Golubatz Midge (*Simulium columbaczense*)].**—*Arhiv Minist. Poljopriv., Belgrade.* **5.** No. 11. 106-115. [Numerous refs.] [German summary].

An account of the natural insect enemies of *S.c.*, including *Hilaria maura, Dioctria longicornis, Chirosia crassisepta, Gyrinus natator, Hydrometra stagnorum, Gerris najas* and *Velia rivulorum.* The only one of practical interest is *Dioctria longicornis*, which is the most constant enemy of the midge and preys on it continually ; it has been suggested that this insect might be a possible means of eradication of the midge, as it is evenly distributed over the Golubatz district. —B. Oswald (Križevci).

Senevet, G. (1938). Quelques Ixodidés de la Guadeloupe. **[Some Ixodidae of Guadeloupe].**—*Arch. Inst. Pasteur Algér.* **16.** 226.

Ticks collected from cattle in Guadeloupe were found to be *Amblyomma variegatum* and *Boophilus annulatus australis.* The dog tick *Rhipicephalus sanguineus* was also obtained in the area. It is suggested that *A. variegatum* is the vector of *Actinomyces farciminosus* in Guadeloupe, and not, as has been suggested by some writers, *Hyalomma aegyptium*, since this tick does not occur in America.—J. MacL.

Bishopp, F. C., & Smith, C. N. (1938). **The American Dog Tick, Eastern Carrier of Rocky Mountain Spotted Fever.**—*Circ. U.S. Dep. Agric.* No. 478. pp. 25. 12 figs., 8 tables. [15 refs.]

A detailed account is given of the bionomics of *Dermacentor variabilis*, which is probably the only vector of Rocky Mountain spotted fever in the central and eastern portions of the U.S.A. It is also a vector of tularaemia in man and animals and of anaplasmosis in cattle. The dog is the chief host of adults, though other large mammals may be attacked. Low relative humidity is the most important limiting factor in its distribution. The seasonal incidence varies in different parts of the U.S.A., but in general the adults are most abundant in spring and early summer. In the south they have been found in every month of the year. Control measures are discussed ; in large areas where large mammals are few, the treatment of dogs would probably result in satisfactory control. An effective wash for dogs can be made by dissolving 1 oz. soap in 1 U.S. (0·83 imperial) gallon of water, and adding 2-4 oz. derris powder with a rotenone content of 4%. The treatment should be applied at intervals of 5-6 days.—W. Moore.

Cameron, A. E. (1939). **Insect and Other Pests of 1938.**—*Trans. Highl. agric. Soc. Scot.* **51.** 136-153. 2 figs. [18 refs.]

This paper gives a general account of the economic importance, hosts, geographical distribution, life history, seasonal incidence and probable methods of control of the sheep tick *Ixodes ricinus* in Britain. The suggested methods of control in ascending order of importance are :– (1) burning of infested pasture and moorland, (2) drainage and liming of marshy ground on which the sheep tick abounds, (3) starvation of the tick by removal of stock for a year or more from infested pasture, and (4) dipping of infested live-stock with efficient acaricides. At the present stage of our knowledge the dipping method is the one which offers most protection to sheep. Dipping, to be effective, must be undertaken at the seasons of the year when the ticks display their greatest activity on the sheep. For a Border farm the following schedule of dipping is recommended :– (1) (barren ewes) three weeks before lambing, (2) entire flock a day or two before lambing begins, (3) unlambed ewes and barren ewes three weeks after the beginning of lambing (ewes with lambs at foot should also be dipped if possible), and (4) entire stock six weeks after the beginning of lambing. The autumn incidence is often so slight as to be practically negligible.—W. Moore.

PARASITES IN RELATION TO DISEASE [HELMINTHS]

I. Harnisch, O. (1937). Zellfrei arbeitendes Oxydans im Gaswechsel von *Ascaris lumbricoides* und einigen Cestoden. [**Oxidizing Enzymes in Gas Production by** *A. lumbricoides* **and some Cestodes**].—*Z. vergl. Physiol.* **24.** 667-686. [Copied *verbatim* from *Helminth. Abstr.* **6.** 226. Signed R. H. H.]

II. Krüger, F. (1937). Bestimmungen über den aeroben und anaeroben Stoffumsatz beim Schweinespulwurm mit einem neuen Respirationsapparat. [**Aerobic and Anaerobic Metabolism in Swine Ascarids as shown by a New Apparatus**].—*Ibid.* 687-719. [Copied *verbatim* from *Helminth. Abstr.* **6.** 226. Signed R. H. H.]

III. Oesterlin, M. (1937). Die von oxybiotisch gehaltenen Ascariden ausgeschiedenen Fettsäuren. [**Fatty Acids Excreted by Ascarids in Oxybiosis**]. —*Ibid.* **25.** 88-91. [Copied *verbatim* from *Helminth. Abstr.* **6.** 226. Signed R. H. H.]

I. Harnisch has demonstrated the presence of oxidizing enzymes in the body fluid and tissue extracts of Ascaris and some cestodes. It is probable that these have a marked influence on the oxybiotic metabolism of the worms, which normally live under anaerobic conditions.

II. Krüger has carried out experiments *in vitro* on the respiration of Ascaris. In general the metabolic rate was higher the smaller the worm. Intake of O_2 and output of CO_2 and fatty acids varied with O_2 tension. The production of fatty acids was a maximum with a low O_2 tension, but was smaller with a high O_2 tension than in the absence of O_2. Under anaerobic conditions the molecular ration of CO_2 to fatty acid varied from 3·5 to 11·1, with an average of approximately 5. In the presence of about 5% of O_2 this fermentation quotient fell to approximately 4, due to an increased secretion of fatty acids.

III. Oesterlin obtained ether extracts of the products excreted by pig ascarids under oxybiotic conditions. Fractional distillation led to the separation of formic, acetic and valeric acids, and probably of butyric acid. In addition small quantities of higher acids were obtained but these were not identified. The chief excretory product was valeric acid.

KATSURADA, F. (1937). Beitraege zur Kenntnis der Biologie und der pathogenen Bedeutung der Trematoden. [**Biology and Pathogenic Significance of Trematodes**].—*Papers on Helminthology, Commemorating 30 Year Jubilee of Prof. K. I. Skriabin.* pp. 281-286. [7 refs.] [In German: Russian summary]. Moscow: Lenin Acad. Agric. Sci.

K. points out that some trematodes, when infecting an unnatural host, may live for only a very short time, producing few eggs, and at the same time may cause serious pathological changes in the host. Examples are given from work done by himself and others. Of special interest is the case of a cat which was experimentally infected with *Metorchis oesophagolongus* by feeding it with fish carrying encysted cercariae. The cat developed acute enteritis and diarrhoea and died seven days after infection. Other experimental infections described include *Paracoenogonimus ovatus* in a mouse, *Metagonimus katsuradai* in man, rat, mouse, dog and cat, *Petasiger linguiformis* in rat and puppy and *Stamnosoma* spp. in various mammals.—A. L. WILSON.

WERTHEIM, P., & RUKAVINA, J. (1939). Prethodna obavijest o Dicrocoelium lanceatum kod nas. [**Preliminary Report on *Dicrocoelium lanceolatum* in Yugoslavia**].—*Vet. Arhiv.* **9.** 66-69. 1 table. [5 refs.] [French summary].

Several hundreds of snails, collected in the Gospic district, Croatia, Yugoslavia, were examined for *Cercaria vitrina*, the early stage of *D.l.* It was found in 14 out of 97 *Zebrina detrita*, and in three out of 602 *Helicella ericetorum*. Seven other species of snails were examined with negative results.—B. OSWALD (KRIŽEVCI).

I. BALOZET, L., & CALLOT, J. (1938). Trématodes de Tunisie. 2. Infestation de *Bulinus truncatus* par *Schistosoma bovis* et *Paramphistomum cervi* dans la Tunisie septentrionale. [**Tunisian Trematodes. II. Infestation of *B. truncatus* with *S. bovis* and *P. cervi* in Western Tunisia**].—*Arch. Inst. Pasteur Tunis.* **27.** 184-188. [17 refs.]

II. BALOZET, L., & CALLOT, J. (1939). Trématodes de Tunisie. 3. Superfamille *Heterophyoidea*. [**Tunisian Trematodes - Heterophyoidea**].—*Ibid.* **28.** 34-63. 4 figs., 4 tables. [Numerous refs.]

[Part I of this series concerns only trematodes of frogs].

I. The authors record the existence of the snail *Bulinus truncatus*, infested by the cercariae of *Schistosoma bovis* and *Paramphistomum cervi* in Western Tunisia.

II. Attention is drawn to the ease with which heterophyids adapt themselves to a variety of final hosts, and to an easy means of identification of larval forms by rearing to the adult stage in laboratory animals. Natural and experimental infections of cats with *Heterophyes heterophyes*, *H. dispar*, *H. aequalis* and *Ascocotyle italica* are described. *Stictodora sawakinensis* is recorded from a wild duck, together with various other species from various migratory birds. Experimental infections, obtained by feeding with fish intermediate hosts, included *Centrocestus cuspidatus* in the rat, *Pygidiopsis genata* in cat, rat and mouse, *Haplorchis pumilio* in cat, rat and pigeon, and *Levinseniella pellucida* in the mouse. All twelve species mentioned are said to be recorded from Tunisia for the first time.

Cawston, F. G. (1939). **The Sites of Adult Schistosomes in Relation to Their Life-Cycle.**—*Indian J. vet. Sci.* **9.** 87-89. [8 refs.]

The author notes that adult schistosomes choose sites in the final host from which the ova have best access to their mollusc hosts—*e.g.* bowel wall and bladder wall, from which the ova escape into marshy soil or pools. In the case of nasal schistosomiasis in cattle, the mucous nasal discharge probably affords access to secondary hosts if the ova are deposited on dry ground; the incidence of the disease probably is higher if stock are watered from ponds, as *Lymnaea* spp. breed readily in shallow water with plenty of sunshine.—M. L. Bingham.

Cawston, F. G. (1939). **Variation in the Shape of Schistosome Ova.**—*Trans. R. Soc. trop. Med. Hyg.* **32.** 553-554. [3 refs.]

After some preliminary remarks on size ranges of the eggs of various species of schistosomes, C. discusses the possible connexion between egg shape and nature of environment, life cycle, etc.—E. S.

I. Balozet, L. (1937). *Brachylaemus suis mihi* 1936, trématode de l'intestin du porc—role pathogène et cycle évolutif. [**Pathogenic Role and Development of** *Brachylaemus suis*].—*Arch. Inst. Pasteur Tunis.* **26.** 36-67. 13 text figs., 18 figs. on 2 plates. [11 refs.]

II. Balozet, L. (1937). Rôle pathogène de *Brachylaemus suis*. [**Pathogenic Role of** *Brachylaemus suis*].—*Bull. Acad. vét. Fr.* **10.** 171-175. 1 fig. [3 refs.]

A description of the parasite and its intermediate host is given. In certain specimens, particularly in those fixed alive and under pressure, very fine and small spines were seen on the cuticle at the anterior end. The intermediate hosts are various species of snails of the genera *Xerophila* and *Helix*. The eggs hatch at the end of the third day, but the resistance of the miracidium to adverse conditions of temperature and moisture is very weak. It cannot live in the soil, and because of this it is suggested that the miracidium hatches out in the body of the snail. The snails could not be infested by feeding the eggs of the parasite to them in the laboratory, though it is stated that this must present no difficulty in the pastures since most, if not all, of the snails taken from the pastures were infested with sporocysts, cercariae, or metacercariae. Several snails of which there was an unlimited supply in the pastures were collected and the metacercariae taken from them were fed to various animals. In rabbits, rats, mice and pigeons the metacercariae developed into adult parasites whilst g. pigs, hens and ducks were refractory. To establish the parasite as a new species it is compared with twenty-seven other species of *Brachylaemus*. The parasite is pathogenic only to very young animals, and when the infestation is severe or when the animals are suffering from some other disease. It is stated that the pigs eat the snails to get the

mineral salts in their bodies. It is suggested that as a prophylactic the pastures should be left free for one year, at the end of which time the snails would have eliminated all the metacercariae.

II. A précis of I.—A. L. Wilson.

Murashkintsev, N. S., & Malevich, J. J. (1937). Izuchenie biologii Moniezia expansa. [**A Study of the Biology of** *Moniezia expansa*].—*Papers on Helminthology, Commemorating 30 Year Jubilee of Prof. K. I. Skriabin.* pp. 418-426. 3 tables. Moscow: Lenin. Acad. Agric. Sci.

The authors considered it very doubtful whether *M. expansa* could develop without an intermediate host. They carried out experiments on lambs, and concluded that these animals were usually, though not invariably, protected from infestation if they were kept indoors [see also next abstract].

Stunkard, H. W. (1938). **The Development of** *Moniezia expansa* **in the Intermediate Host.**—*Parasitology.* **30.** 491-501. 9 figs. on 1 plate. [Num. refs.]

S. gives a fuller account of the experiments reported in two previous papers [*V. B.* **8.** 371 and 443]. The developmental stages found in experimentally infected galumnid mites are described, and photomicrographs of the living larvae are presented. An interesting point is the mechanical discharge of the eggs from the drying proglottid (*e.g.*, in faeces) on to the surrounding soil or grass, a natural habitat of these mites.—E. S.

Campbell, D. H. (1939). **The Effect of Sex Hormones on the Normal Resistance of Rats to Cysticercus crassicollis.**—*Science.* **89.** 415-416. 1 table. [2 refs.]

After two weeks of daily injections of sesame oil, young male and female rats fed with eggs of *Taenia taeniaformis* developed average infections of 62 and 42 cysts respectively (normal sex difference in resistance to *C. crassicollis*). After sesame oil + theelin injections, average counts of 50 and 45 cysts were found in males and females, and after sesame oil + testosterone propionate, of 64 and 60 cysts, the normal resistance being sharply altered by these injections.—E. S.

Salisbury, L. F., & Anderson, R. J. (1939). **Concerning the Chemical Composition of** *Cysticercus fasciolaris.*—*J. biol. Chem.* **129.** 505-517. 1 fig., 1 table. [Numerous refs.]

A detailed account is given of the methods used to extract and purify the various soluble compounds from *C. fasciolaris*, and the properties of the constituents, especially lipids and carbohydrates, were studied. As is the case in some mature helminths, the glycogen content was found to be very high (30%), and so also was the amount of ash (over 16% dry material). Aqueous extracts of dried larvae, as well as the ash, were strongly alkaline, due to the presence of large amounts of sodium and potassium, although the ash consisted mainly of magnesium and calcium phosphate. The lipids consisted mainly of phospholipids, cholesterol and cerebrosides, with only a small proportion of glycerides.—M. L. B.

Sang, J. H. (1938). **The Antiproteolytic Enzyme of** *Ascaris lumbricoides* **var.** *suis.*—*Parasitology.* **30.** 141-155. 7 figs., 2 tables. [Numerous refs.]

The term " ascarase " is suggested for an extract of *Ascaris*, which is shown to be a protease, and to be the same substance which exerts an inhibitory effect on pepsin and trypsin. The latter effect is stated to be produced by combination of the ascarase with the enzyme, but it does not occur with papain.

It is a readily diffusible substance, probably of the order of a primary albuminose, is precipitated by $(NH_4)_2SO_4$ and 70% alcohol, is destroyed slowly in acid

but rapidly in alkali and is not digested by trypsin ; it is most active at pH 5-7. It occurs throughout the body of the worm, most abundantly in the gonads and alimentary canal. Its function in the worm and effect on the host are discussed. —E. S.

I. Macheboeuf, M., & Mandoul, R. (1939). A propos de la toxicité des extraits d'*Ascaris*. [**Toxicity of Extracts of** *Ascaris*].—*C. R. Soc. Biol. Paris.* **130.** 1032-1034. [4 refs.]

II. Mandoul, R. (1939). Etude comparative de la toxicité des extraits d'*Ascaris* et de *Taenia*. [**Relative Toxicity of Extracts of** *Ascaris* **and** *Taenia*].—*Ibid.* 1035-1036. [1 ref.]

I. The conclusions reached after studying extracts of whole *Ascaris megalocephala* are that this parasite contains a substance toxic for g. pigs when inoculated intravenously. It is soluble in trichloracetic acid at a dilution of 4%, and is not dialysable through collodion sacs. Its nature was not clearly determined ; it does not belong to the histamine or albumin and globulin groups, and it is not comparable to bacterial exotoxins and phytotoxins. The method of preparation of the extract is described in detail.

II. In experiments, similar to those described above, carried out with *Moniezia expansa*, no evidence was found of an analagous toxic substance.

Much of the toxic substance of *Ascaris* occurs in the perienteric fluid, but a large part of it is fixed in the tissues ; it can be extracted only by the use of certain reagents ; *e.g.* a solution of trichloracetic acid is better for this purpose than physiological saline. The trichloracetic extracts of both helminths contained large quantities of glycogen.—M. L. Bingham.

Taylor, E. L. (1939). **The Rôle of Pastures in the Development of the Strongyloid Diseases of Grazing Animals.**—*Vet. Rec.* **51.** 495-498. Discussion pp. 498-504.

In discussing the management of pastures and of grazing animals on pastures T. emphasized three facts of importance in strongyloid diseases. First, no multiplication of parasites in the body of the host ; second, large numbers of eggs produced during the parasitic stage ; and third, almost ubiquitous distribution of these parasitic worms. He suggests that adult animals have a relatively strong immunity, which serves to give some elasticity to the balance between host, parasite ane environment. It is possible to limit parasitic infestation in animals crowded on rich pasture. This requires a knowledge of factors which influence development of larvae, their longevity, their rate of mortality and the rate of intake by grazing animals.

In considering these points T. discounts the role of wet pasturage which is usually considered to play an important part. Cold slows down the rate of development of larvae, but this effect leads to a later increased acquisition, because of concentration when larvae develop *en masse* as warm conditions recur. Similar effects are caused by long periods of drought followed by rain.

Badly managed arable land is always dangerous. Long grass retards the formation of a " hard skin " on faeces and so allows better aeration, with survival of larvae.

The rate of mortality of larvae is shown by experimental data to be rapid during the first few weeks of external existence, and only a very small proportion survives for twelve months. Drought seems to be the most lethal single factor for resting stages of larvae.

Consequently short existence is general for those climbing highest in the

herbage, whilst those obstructed in their upward migration usually find conditions sufficiently moist for survival. Chemical dressings for infected pastures are not advocated, and mixed grazing is considered the best treatment.

The important bearing of drought-affected pastures and the stimulation of clover growth by artificial manurial dressings, with resultant increased intake of parasites, is stressed. The importance of the structure and habits of growth of plants in any pasture analysis is detailed.—C. V. Watkins.

Davey, D. G. (1938). **Studies on the Physiology of the Nematodes of the Alimentary Canal of Sheep.**—*Parasitology*. **30.** 278-295. 1 fig., 3 tables. [Numerous refs.]

D. found that rearing two lambs on a cellulose-free diet did not affect their susceptibility to infection with *Haemonchus contortus*, *Ostertagia circumcincta*, *Nematodirus* spp. and *Cooperia curticei*.

The optimum concentration of a simple physiological saline for *O. circumcincta* was found to be 0·9% NaCl, 0·042% KCl and 0·024% $CaCl_2$; when these proportions were maintained it was possible to vary the NaCl content between 1·3% and 0·4%, and, by replacing salts in part by glucose, it was found that the worms could survive with as little as 0·15% NaCl. The pH range for this species was from 3·2 to 9, from which it was inferred that it could not parasitize the stomach of carnivores or horses, or the abomasum of cattle.

The pH ranges of the intestinal nematodes are also given. A graph showing the distribution of the worms along the intestine indicates a fairly close correlation between tolerance of the worms for bile salts and concentration of these salts in the portion of the intestine where each species is normally found. Attempts were made to feed nematodes in abomasal fluid, intestinal contents, blood serum, peptic digest of blood and defibrinated blood. Worms were first sterilized externally with acriflavine solution, subsequent bacterial growth being largely avoided by use of an apparatus to provide a continuous flow of the culture medium. In no case, however, did the worms survive longer than in the saline solution referred to above. D. therefore believes that they must feed on tissue elements of the mucosa.

The haemoglobin present in some species is shown to be spectroscopically distinct from that of sheep, and D. postulates its synthesis by the worm, possibly as a means of utilizing the scanty oxygen of its habitat.—E. S.

Glaser, R. W., & Stoll, N. R. (1938). **Sterile Culture of the Free-Living Stages of the Sheep Stomach Worm,** *Haemonchus contortus*.—*Parasitology*. **30.** 324-332. 3 figs., 1 table. [20 refs.]

In an earlier paper the authors reported the sterilization of larvae at the end of their free-living existence, and their development in a sterile medium into infective larvae [*V. B.* **8.** 587]. In the present paper they record the successful rearing of the worm from the egg under sterile conditions. White's solution (0·65% NaCl, with $HgCl_2$, HCl and C_2H_5OH) was used to sterilize the eggs, of which 74% were found to be viable after 10 minutes, and 49% after 20 minutes in the fluid. The eggs were then inoculated on to a sterile culture medium (pH 7·0), consisting of rabbit kidney, liver-extract agar and killed, ground bakers' yeast. A yield of infective larvae as high as 25% of the viable eggs introduced was obtained from this medium. These larvae were normal in every respect, except that they were of smaller average size than faecal-grown specimens. Their infectivity was proved by feeding 3,000 to a bottle-fed, worm-free lamb, whose faecal egg-count later reached 540,000 daily, *i.e.*, 1,800 per larva fed.—E. S.

Torres, S. (1938). Séca dos caprinos e ovinos (gastro-enterite verminosa) no estado de Pernambuco. [**Verminous Gastro-Enteritis of Goats and Sheep in Pernambuco State, Brazil**].—*Bol. Soc. brasil. Med. vet.* **8.** 207-211. 6 figs. on 3 plates. [6 refs.] [English summary].

T. discussed chronic helminthiasis due to *Haemonchus contortus, Trichostrongylus extenuatus, T. colubriformis, Cooperia punctata, Oesophagostomum columbianum* and *Trichuris ovis*. An infestation with *Eimeria* was frequent and when it occurred the mortality was heavier. Treatment with copper sulphate solution gave good results.—A. H. Hunter.

Andrews, J. S. (1939). **Life History of the Nematode Cooperia Curticei, and Development of Resistance in Sheep.**—*J. agric. Res.* **58.** 771-785. 3 figs., 1 table. [Numerous refs.]

Seven lambs, raised free from nematode parasites, were infected experimentally with larvae of *Cooperia curticei*, and used to study the life history of the parasite. It was found that in general the life-cycle was similar to that of *Trichostrongylus*. At room temperature the eggs hatched in 20 hours after passage in the faeces; larvae were infective about 90 hours later. On entry into the host the larvae underwent almost immediate ecdysis, and migrated into the crypts of the anterior portion of the small intestine. Here another ecdysis occurred 4 days after entry into the host. The larvae returned to the lumen on the 5th day and passed through a final ecdysis on the 9th day. They were mature in 14 days and appeared in the faeces in 15 days. Sex differentiation was observed at the final ecdysis.

During the work it was noted that lambs receiving small doses of larvae over prolonged periods developed resistance against reinfection. The resistance was evidenced by an inflammatory reaction which resulted in the production of nodules in the intestinal mucosa. The development of the nodules was significant, since the larvae did not penetrate the tissues of the host, but merely came into close contact with them.—D. D. Ogilvie.

Levine, P. P. (1937). **The Effect of Various Environmental Conditions on the Viability of the Ova of** *Capillaria columbae* **(Rud.).**—*J. Parasit.* **23.** 427-428. [See also *V. B.* **9.** 720 and **8.** 588].

C. columbae is pathogenic for chickens. Experimental methods are described. Some of the results are compared with those obtained with *Ascaridia lineata*. Drying was rapidly fatal to the embryonated ova; they were found to be viable after 384 days' exposure in the shade, but not after 500 days, and they survived after 146 days in the sun, but not after 191; non-embryonated ova, on the other hand, were found to have been killed after only 129 days' exposure in the sun. Embryonated ova were killed by 14 days' drying with an electric fan; they survived freezing for 316 days, but were dead after 346 days. When exposed at room temperature in putrefying faeces they survived for 20 days, but were dead after 28 days, whereas non-embryonated ova tested in the same way survived for 42 days but were dead after 57 days. Heating tests showed that embryonated ova in water were viable after heating at 40°C. for five minutes, but were killed at 50°C.

—S. G. Iyer.

Olson, C., & Levine, P. P. (1939). **A Study of the Cellular Elements and Hemoglobin in the Blood of Chickens Experimentally Infected with Capillaria Columbae (Rud.).**—*Poult. Sci.* **18.** 3-7. 1 table. [10 refs.]

One group of eight-week-old Rhode Island Red chickens was experimentally infected with *C. columbae* and another was kept as a control. During the course

of the work an unknown factor caused a leucocytosis in the birds of both groups at the time when the infected birds were showing clinical symptoms of parasitism. This leucocytosis was, however, significantly greater in the infected group ; the average absolute number of heterophils and eosinophils was highest 21 days after infection, and was significantly higher than that of the controls, whereas the mean absolute values for lymphocytes, monocytes, basophils and thrombocytes were not significantly different. At the same time the erythrocyte counts and values for haemoglobin in the infected group were significantly lower.—L. E. Hughes.

Emmel, M. W. (1939). **Observations on Capillaria Contorta in Turkeys.**—*J. Amer. vet. med. Ass.* **94.** 612-615. 4 figs. [5 refs.]

The references to this parasite in the literature are discussed, and a description is given of its occurrence in three large turkey flocks. The ages of the birds varied up to a maximum of 8 months. The symptoms noted were indisposition, weakness, emaciation and a penguin-like posture. The gross and histopathological lesions seen are described in detail ; these were confined to the oesophagus and crop, with the parasites located in the epithelial layer. The addition of 5% commercial flowers of sulphur to the mash caused a marked improvement in each flock.—L. E. Hughes.

Dinnik, J. A., & Dinnik, N. N. (1937). Stroenie skorlupy i rezistentnosty yaits Trichocephalus trichiurus (L., 1771). [**The Structure of the Shell and Resistance of the Eggs of** *Trichuris trichiura*].—*Papers on Helminthology, Commemorating 30 Year Jubilee of Prof. K. I. Skriabin.* pp. 132-138. 2 figs., 1 table. [10 refs.] Moscow : Lenin Acad. Agric. Sci.

Subjecting the ova of *Trichuris trichiura* to the action of alcohol, ether, organic and inorganic acids, the authors found that the shell of these ova contains four layers, the innermost of which consists of an apparently lipoid substance of fibrous structure which serves as a protection against desiccation and the action of chemicals. Polar plugs at both ends are connected with the third envelope. They readily absorb and give off moisture. The outer envelopes protect the ova from mechanical injury.

Development of the larvae is slow, taking about 21 days at 30°C.

IMMUNITY

I. Glover, R. E. (1937). **The Use of Synthetic Medium Tuberculin in the Application of the Double Intradermal Tuberculin Test.**—*Vet. Rec.* **49.** 945-948. 2 tables. [7 refs.]

II. Montgomerie, R. F., & Thomson, A. (1938). **The Potency of Synthetic Medium Tuberculin for Use in the Double Intradermal Test in Cattle.**—*Ibid.* **50.** 1759-1772. 4 tables. [8 refs.]

III. Montgomerie, R. F., & Thomson, A. (1939). **Tuberculin Purified Protein Derivative (P.P.D.) in the Double Intradermal Test in Cattle—Preliminary Observations.**—*Ibid.* **51.** 229-236. 5 tables. [8 refs.]

I. The non-specific constituents of O.T. were found to give small reactions in cattle. This led to confusion in reading the results and efforts were made to purify the tuberculin. Some purification could be obtained by precipitation with ammonium sulphate and treatment with acetone, but this led to loss of potency. A synthetic medium tuberculin was prepared according to the method used by the U.S.A. Bureau of Animal Industry. Instead of concentrating by heat it was

precipitated by ammonium sulphate, re-dissolved in a glycerolated solution at twenty times its original strength, filtered through a bacterial filter and preserved with merthiolate. This tuberculin gave good reactions in infected animals without false positives in negative cases. The difference between this tuberculin and O.T. is emphasized, and it is stated that though the character of the swellings remains the same, there is not so great an increase in the skin measurements in positive animals with synthetic medium tuberculin. The presence of diffusion remains the deciding factor.

II. Synthetic medium tuberculin from the Royal Veterinary College (C.T.) the U.S.A. (U.S.A.) and the Wellcome Laboratories (L.C.) were tested against one another with the double intradermal test. The U.S.A. and L.C. tuberculins were used at approximately twice the strength of the C.T. Seven cows previously negative and seven previously positive to L.C. were tested. One of the non-reactors responded positively to the U.S.A., while two of the positives were negative to the C.T. tuberculin and one was doubtful. Otherwise the reactions agreed. The testing was then extended to the field, and eleven herds were tested with L.C. and C.T. tuberculins. L.C. tuberculin is stated to have given better reactions than C.T., and not to have caused false reactions. However, P.M. examinations of seven cows, negative to C.T. but positive to L.C., showed that two were not infected with T.B. Two of the others were extensively infected, while the remaining three showed only slight infection. Two other cows which were negative to C.T. and doubtful to L.C. were not found to be infected P.M. [It appears that tuberculins of higher potency than the C.T. tested are necessary to diagnose all cases of tuberculosis, but that if the strength is much above that of C.T. the number of false positive reactions is increased.]

III. A purified protein derivative of tuberculin (P.P.D.), prepared from a human strain, was compared with C.T., L.C. and U.S.A. tuberculins in tests in 352 previously negative and 74 previously positive cows. When diluted 1:3 it was found to be of twice the potency of C.T. and to be an efficient agent in detecting TB. in animals of low sensitivity (as judged by the other tuberculins). The agreement between P.P.D. and L.C. was very close, whereas C.T. failed to give positive reactions in many (4 out of 15 in one case) of those positive to P.P.D. Only one cow definitely P.P.D. positive and C.T. negative was examined P.M., and in this animal there was generalized TB. The advantages claimed for P.P.D. are (1) greater sensitivity, (2) higher purity, (3) few false reactions, (4) great stability in the dried form, and (5) higher potency and in many cases the need of only one injection. Its sole disadvantage appears to be a tendency to produce a soft-pea type of swelling in negative animals. In an addendum the authors state that since their experiments were concluded C.T. tuberculins have increased in potency.—P. S. Watts.

I. Plum, N. (1939). Die Rolle der Tuberkulinproben in der Bekämpfung der Tuberkulose. [**The Role of Tuberculin Testing in the Eradication of Tuberculosis**].—*Rep. 13th int. v t. Congr. 1938.* **1.** 399-405. [In German: English, French and Italian summaries. Discussion pp. 454-458 in English and German].

II. Zeller, H. (1939). Die Rolle der Tuberkulinproben in der Bekämpfung der Tuberkulose. [**The Value of the Tuberculin Test in the Control of Tuberculosis**].—*Ibid.* 406-420. [In German: English, French and Italian summaries. Discussion pp. 454-458 in English and German].

III. 't Hooft, P. J., & Veenbas, A. H. (1939). Die Rolle der Tuberkulinproben in der Bekämpfung der Tuberkulose. [**The Role of the Tuberculin Test**

in the Fight against Tuberculosis].—*Ibid.* 438-453. [Numerous refs. [In German : English, French and Italian summaries. Discussion pp. 454-458 in English and German].

I. The application of the tuberculin test is the only basis for eliminating TB. P. advocates the intradermal test but emphasizes that cattle may react strongly without bovine type TB. being present. This is especially true in Denmark with avian type TB. and P. holds that avian and bovine tuberculins should both be employed (though he admits the difficulties in differentiating between the reactions) and that cows reacting more strongly to the avian tuberculin should not be considered infected with bovine type TB. [see also *V. B.* **10.** 159].

II. The use of the intradermal tuberculin test is advocated. The following points are stressed :– (1) technique and principles of readings must be standardized, (2) a synthetic medium tuberculin is preferable, (3) bovine tuberculin should be used, and (4) the tuberculin should be internationally standardized and tested on cattle.

III. The authors consider that it is not definite which is the best method of tuberculin testing or of preparing tuberculin. They emphasize the need for more work on this subject. It is pointed out that where, for economic reasons, all reactors cannot be segregated or disposed of, routine clinical examinations go far towards retarding the spread of the disease.—P. S. Watts.

I. Mohler, J. R. (1939). **The Value of Tuberculin Testing in the Eradication of Tuberculosis.**—*Rep. 13th int. vet. Congr. 1938.* **1.** 388-398. [In English : French, German and Italian summaries. Discussion pp. 454-458 in English and German].

II. Glover, R. E. (1939). **The Role of the Tuberculin Test in the Fight against Tuberculosis.**—*Ibid.* **1.** 421-437. [Numerous refs.] [In English : French, German and Italian summaries. Discussion pp. 454-458 in English and German].

I. Up to 1934 old tuberculin was used for the control and eradication of tuberculosis in the U.S.A., but before that year a special F tuberculin prepared on a synthetic medium was evolved. It has proved to be more potent, purer and therefore superior biologically. A series of tests on 13,288 cattle in some hundreds of herds, in which simultaneous administration of old and synthetic medium tuberculin was made, revealed the superiority of the latter. The incidence of " no-lesion " reactors (63) in these tests compared with an average incidence of 0·2 % for the whole country, according to P.M. statistical evidence. Histological search of large numbers of such cases showed tuberculous lesions in 50 sites in the carcasses, and suggests the great reliability of the test. As eradication has progressed, " no-lesion " reactors have increased, probably because the test has detected them in the very early stages. Similarly, advanced-lesion reactors have decreased with continued progress of the control.

The only tuberculin produced since 1935 by the B.A.I. is the F tuberculin, several strains of human type *M. tuberculosis* being used. Avian tuberculin has been used for differentiating avian type infection and sensitization caused by Johne's bacilli, some lepra bacilli and two strains of " skin-lesion " bacilli. " Skin-lesion " reactions are usually slight and occur only once, being classed as suspect pending retest.

The intradermal application of tuberculin simultaneously into the caudal fold and the vulva has given the best results. The subcutaneous route is permissible for interstate exchange of animals when time in transport is important.

The efficiency of the test is emphasized by the statistics of the last 20 years,

during which 3,500,000 affected animals have been eliminated. Retests of 187,678 of these, three years after first test, revealed only 0·1% reactors. Out of about 10 million cattle examined P.M. annually by the Federal Meat Inspection Service, 6,284 carcasses were condemned in 1937 as compared with 23,214 in 1932, parts of carcasses condemned in 1937 being one-third the number condemned in 1932.

At present there are about 275,000 accredited herds (passed two annual or three semi-annual tests) and 99% of the 3,071 county areas throughout the country are modified accredited areas (less than 0·5% reactors).

An annual loss of 40 million dollars occurred before the control plan was adopted in 1917, and the percentage of tuberculous cattle, which was formerly 4·9%, had been reduced to 0·4% by 1937.

H. G. emphasized that the numerous control plans based on tuberculin testing in many countries had progressed chiefly because of the use of the much easier intradermal test as compared with the subcutaneous test.

He compared the various methods of testing, especially as regards the usual sites of the intradermal tests and whether they should be by single or double injection. In both the paper and the discussion emphasis was laid on the importance of the character of the swellings. There was great diversity of opinion on the criterion of increase in skin thickness in various countries.

G. discussed synthetic medium tuberculin and gave an historical survey of the problems of concentrating, denaturing and purifying the product. In the British Isles only denatured products are permitted for official tests, it being considered that some loss in potency is preferable to untoward reactions occurring in non-tuberculous animals. He cited an experiment on five normal cattle which received unheated precipitated tuberculin (undenatured tuberculin protein) intradermally. Three became sensitive after five injections, when they reacted positively. In addition G. showed the importance of well tried strains of *M.t.* for tuberculin preparation, as some strains produce not only strong potency but also non-specific substances which are not entirely removed by the usual methods of purification. Any standardization of tuberculin should be upon both positive and negative animals of the same species as that on which it will be used.

Recent investigations on " skin-lesion " reactors were surveyed.

An experiment, in which an attempt was made to sensitize calves to tuberculin with several organisms coated in gum acacia solution and then emulsified with olive oil, failed with *Corynebacterium pyogenes*, *C. pseudotuberculosis ovis*, *Actinomyces bovis*, *Actinobacillus lignieresi*, and *Mycobact. phlei*, tests being made with " O.T.", synthetic and avian tuberculins and with johnin. Calves treated with *M. johnei* reacted irregularly with all these products. Sensitization of cattle with both avian and human types was recorded. The main conclusions of work dealing with desensitization areas of skin after repeated intradermal tests were briefly mentioned.

An outline of the Attested Herds Scheme of the Ministry of Agriculture was given, and control measures in the U.S.A., Canada and the Scandinavian countries were mentioned.

Discussion

In the discussion on the above papers Stenius referred to the experience in Finland, where the test has been greatly developed to the extent that the type of infection can be diagnosed without recourse to cultural or animal inoculation methods. The character of the reaction, even more than the skin measurement difference, is considered to be important. He also stated that the avian type bacillus may cause definite lesions, and even open TB. in cattle, but that the human type bacillus cannot do so.

Plum did not agree that synthetic medium tuberculin is more specific as to the reactions engendered than old tuberculin. What is needed is a tuberculin which will detect bovine type infection exclusively.—C. V. Watkins.

I. Vellisto, E. (1938). Wie ändert sich der Agglutinationswert im Zusammenhange mit der Dauer der Beobachtungszeit? [**Variation in Agglutinin Titre over Long Periods of Observation**].—*Eesti loomaarstl. Ring.* **14.** 169-180. 6 tables. [16 refs.] [In German].

II. Vellisto, E. (1938). Einiges über den Einfluss der Wärme auf die Agglutinationsreaktion. [**The Influence of Temperature on the Agglutination Reaction**].—*Ibid.* 201-216. 7 tables. [In German].

I. A few experiments were made with samples of sera and udder secretion on the agglutination of suspensions of bacteria. Attention is drawn to the different techniques used, especially to the length of time the mixtures are kept under observation. In general the mixtures were kept by the author at a temperature of 37°C. for from 4-24 hours and then observed at room temperature for some days. The titre increased, as a rule, with the length of time for which the mixture was incubated and observed and it is pointed out that the result obtained in an agglutination reaction should be regarded as a relative and not as an absolute measure of agglutinin content.

II. A few experiments were made with the agglutination of suspensions of bacteria of the salmonella and brucella groups, by sera of man and cow, and by the udder secretion of bovines. The time of observation and the temperature were varied and in general an earlier reaction was observed if the mixtures were kept at a higher temperature. For example, the mixtures incubated in a water bath at 56°C. reacted more quickly than if incubated at 37°C. or kept at room temperature.—R. Lovell.

I. Elder, C. (1939). **Comparative Results of Tube and Plate Tests for Bang's Disease on Suspicious Animals.**—*J. Amer. vet. med. Ass.* **95.** 38-43. 3 tables. [7 refs.]

II. Donham, C. R. (1939). **Sources of Error in the Agglutination Test for Bang's Disease.**—*Ibid.* 136-139.

I. E. tabulates comparative results of over 12,000 blood tests for bovine brucellosis by the tube and plate methods to ascertain which method gave less suspicious reactions.

The plate method gave slightly fewer suspicious reactions and more positive reactions than the tube method.

II. Sources of error in the agglutination test for brucellosis are divided under four headings :- (1) preparation of the antigen, (2) the technique of the test, (3) the interpretation of results—D. here discusses the herd history as a factor to be taken into consideration—and (4) general considerations ; one such consideration mentioned was failure of a pregnant infected cow to react.—C. V. Watkins.

Marcis, Á., & Pintér, P. (1938). A tárgylemezagglutinációs próba értéke a brucellosis kórjelzésében. [**Value of Agglutination Test in Diagnosis of Brucellosis**].—*Állatorv. Lapok.* **61.** 359-361. 3 tables.

A discussion on the relative values of tube and slide agglutination tests with some results of comparative tests.

I. Dubois, C., & Sollier, N. (1939). Diagnostic expérimental de la mélitococcie ovine et caprine par la recherche des réactions d'allergie. [**Diagnosis**

of *Brucella melitensis* Infection in Sheep and Goats by Allergic Tests].—*Rev. gén. Méd. vét.* **42.** 129-150. 6 tables. [8 refs.]

II. Dubois, C. (1933). Modifications de l'intensité des réactions allergiques chez les ovidés atteints de mélitococcie. [**Modified Allergic Reactions in *Br.m.* Infection of Sheep**].—*C. R. Soc. Biol. Paris.* **112.** 1032-1035. 2 tables. [2 refs.]

I. Details are given of the experimental infection of nine ewes and nine goats in the early stages of pregnancy by the subcutaneous inoculation of *Br.m.* A month later, eight animals gave positive reactions to intradermal tests in the lower eyelid with melitin, compared with 13 reactions to killed brucella strains injected into the caudal fold [no differentiation between goats and sheep when results given].

One table gives statistics of natural *Br.m.* infection in 2,000 ewes and 50 goats as determined by the melitin test. Four tables give comparative allergic and serological results in 55 goats and 232 sheep suggesting that the allergic reaction detected more infected or " carrier " animals than did the agglutination test. In conclusion the authors discuss the choice of a site of inoculation, and the specificity, duration and interpretation of the allergic reaction.

II. Twenty infected ewes, half of which had aborted from *Br.m.* infection, were tested six times by the injection of antigen prepared from killed *Br. abortus* into the skin of alternate caudal folds over a period of 27 weeks. At the first test 10 ewes reacted and later 18 reacted. The subsequent reactions were earlier, less intense, and of shorter duration than the first, denoting increased tolerance to the brucellin. Sheep from similar flocks were tested with this antigen, and two groups of positive reactors, containing seven and eight animals respectively, were again injected a week later with the same material, this time into the caudal fold opposite to that used for the first test ; the first group was given this second injection 72 hours after the first injection, and the second group a week after the first injection. Two tables demonstrate that the initial reaction was reactivated or prolonged by the second injection which, however, caused a less intense reaction of much shorter duration than the first.—R. O. Muir.

I. Bedson, S. P. (1937). **Observations on the Complement-Fixation Test in Psittacosis.**—*Lancet.* **233.** 1477-1480. 5 tables. [2 refs.]

II. Meyer, K. F., Eddie, B., & Yanamura, H. (1939). **Complement-Fixation Test with Tissue-Culture-Antigens as Aid in Recognizing Latent Avian Psittacosis (Ornithosis).**—*Proc. Soc. exp. Biol., N.Y.* **41.** 173-176. 1 table. [4 refs.]

I. Owing to risk of human infection and other disadvantages in using crude virulent mouse spleen suspension as an antigen, experiments were undertaken to study the value of boiled antigen in the complement-fixation test for the diagnosis of human psittacosis. The antigenic composition of the virus showed that it consisted of a thermolabile fraction and another fraction resistant to boiling for one hour. Heated antigen was found superior to crude for the complement-fixation test ; the former remained stable even after storage for 15 months.

II. Psittacosis infection in a consignment of birds is as a rule established by P.M. examinations and mouse inoculation. As latent infections may occur, it is now customary to destroy a whole consignment of birds if a case is found among them, although this often involves the unnecessary destruction of valuable birds.

Experiments with a consignment of Australian parrots indicated that the complement-fixation test may detect carrier birds with a high degree of certainty.

A positive result implies infection, either active, latent or past; the test in its present state does not distinguish an existing infection from a sterile immunity resulting from past infection.—S. G. Iyer.

Chung, H., & T'ung, T. (1939). **The Non-Specificity of the So-Called Specific Biological Tests for Hydatid Disease.**—*Trans. R. Soc. trop. Med. Hyg.* **32.** 697-706. 4 tables. [11 refs.]

The authors found that both hydatid and cysticercus fluids gave strong complement-fixation reactions (Ghedini-Weinberg test) with blood of patients with either hydatid (*Echinococcus*) or somatic cysticercus infestation, but not with intestinal taenias. The cerebrospinal fluid also gave a strong reaction in most patients with cerebral cysticercosis. Extracts of *C. cellulosae*, *Dipylidium caninum* and *T. saginata* gave strongly positive reactions with the sera of cysticercosis patients and with that of a rabbit immunized against human hydatid fluid, but were frequently found to be anti-complementary. Sera from five rats infected with *C. fasciolaris* were weakly positive against hydatid fluid, and two were strongly positive against *D. caninum* extract; five uninfected controls were negative.

Diluted hydatid fluid (1:4) was found most satisfactory for tests, as it minimized the number of positive reactions produced in syphilis and other cases.

Both hydatid and cysticercus fluids gave strongly positive intradermal reactions (Casoni's reaction) on patients infested with either *Echinococcus*, *Cysticercus*, or an intestinal *Taenia*.—E. S.

Chandler, Asa C. (1939). **The Nature and Mechanism of Immunity in Various Intestinal Nematode Infections.**—*Amer. J. trop. Med.* **19.** 309-317. [20 refs.]

Much of the immunological work on nematode infections has been devoted to a study of antibody production. C. has studied the mechanism by which a functional immunity, *i.e.* actual resistance to infection, is capable of development independent of circulating antibodies. There are two distinct phases of immunity to intestinal nematodes, (a) a weak general immunity stimulated by metabolic products of growing larvae during parenteral migration of mucosal burrowing, and (b) a strong local immunity stimulated by metabolic products of adult worms in the intestine. The latter plays an important part in immunity to worms which feed on intestinal mucosa, but has little effect in the case of blood-suckers, in which the main immunity results after prolonged infection, and depends on a slowly developing parenteral immunity.—M. L. Bingham.

DISEASES, GENERAL

Potts, M. K. (1938). **Observations on Diseases of Bighorn in Rocky Mountain National Park.**—*Trans. 3rd N. Amer. Wildlife Conf., 1938.* pp. 893-897. Washington: American Wildlife Institute.

For many years the most fatal disease of bighorn sheep was scabies. In 1902 over a very small area 75 bighorns were counted which had died of the disease. Infection was introduced in the first instance by domestic sheep. There has been no serious exacerbation of the plague since early in the century.

In 1935 haemorrhagic septicaemia was diagnosed in bighorn, and was responsible for a number of deaths. A pure culture of *Pasteurella oviseptica* was isolated from the lungs of a ram. *Corynebacterium pyogenes* was detected in other cases. Only adult male animals were attacked. The disease showed little tendency to general spread.

More recently, cases of pneumonia following lungworm infection in the presence of *C. pyogenes* have been reported. Such cases have occurred usually when resistance has been weakened by malnutrition.

If bighorn are not to become extinct better preservation and provision for their food supply are necessary.—D. D. Ogilvie.

I. Dungal, N. (1939). Jaagsiekte und die sogenannte Strongylus-Adenomatose der Lunge des Schafes. Gibt es Jaagsiekte in Deutschland? [**" Jaagsiekte " in Germany and the so-called Strongylus-Adenomatosis of Sheep's Lungs. Does " Jaagsiekte occur in Germany ?**]—*Dtsch. tierärztl. Wschr.* **47.** 178-182. 5 figs. [Numerous refs.]

II. Olafsson, A. (1939). Die seuchenhafte Lungenadenomatose und ihre Bedeutung für die isländische Schafzucht. [**Contagious Lung-Adenomatosis and Its Significance in Sheep Breeding in Iceland**].—*Ibid.* 182-184. [8 refs.]

I. D. gave a general account of an epizootic adenomatosis in the lungs of sheep in Iceland [see Dungal, Gislason, & Taylor, *V. B.* **9.** 104]. D. considered that there was little doubt that the disease is identical with the " jaagsiekte " found in South Africa, though in that country losses are now comparatively slight (2%), whereas the disease in Iceland has resulted in losses as great as 80% on some farms. The serious outbreak in Iceland could be traced with some certainty to the introduction of a ram from Germany. D. raised the question as to whether foci of the disease might exist in that country in subclinical form. There had been no record of adenomatosis in lungs of sheep in Germany, even in the native district of the ram which is presumed to have brought the disease to Iceland, though lungworm invasion is common enough.

II. Sheep breeding is very important in Iceland, where the sheep population numbers about 700,000 and the human population about 120,000. Lambing occurs chiefly in May, and ewes and lambs are driven off to communal hill-pastures in early July. On returning in autumn the sheep are herded together in thousands in a confined space, each owner's flocks being housed separately during the winter. These conditions might well account for the rapid and extensive spread of this condition of adenomatosis since its introduction in 1934. Numbers of deaths often occur after change in environment or feeding, and many of these deaths are due to secondary infection with " lungnapest " [contagious pneumonia—see *V. B.* **3.** 18]. The great difference in mortality rate between adenomatosis and the " jaagsiekte " of South Africa may be due largely to differences in management, and to the frequent occurrence of this secondary infection in Iceland. Control of the disease is attempted by quarantine measures, fencing, etc., but is very difficult. About one third of the country is affected.

O. includes a brief discussion of the principal sheep diseases met with in Iceland (braxy, scab, stomach-worm and lungworm infestation, and contagious pneumonia). In attempts to improve winter rations herring meal has been extensively used, 50-80 g. being fed daily.—H. E. Harbour.

I. Webster, W. M. (1938). **Facial Eczema. (a) From the Veterinary Aspect.** —*Proc. Ann. Meet. Sheep Fmrs., N.Z., 1938.* pp. 37-41.

II. Levy, E. B. (1938). **Facial Eczema. (b) From the Viewpoint of the Pasture.** —*Ibid.* pp. 41-46.

I. The first reported investigations into the disease in New Zealand were carried out by Gilruth in 1910. The visible lesions are the result of burning of the exposed parts of the body by ultra-violet light. Conditions under which facial eczema usually occurs are to be found when a period of warm, wet weather follows

a hot, dry summer, resulting in a sudden flush of young grass. W. describes the symptoms usually observed and the clinical history of an outbreak which occurred at Massey Agricultural College during 1938. An attempt was made to control the disease by early drenching with Epsom salts, and blackening faces and ears to prevent sunburning. The supply of green feed was curtailed and hay was given. In an experimental flock in which it was impossible to apply these last two measures the disease ran a much more severe course than in the other College flocks.

It is considered that the development of the disease in the cattle dairy herd was prevented by feeding ensilage during the dry period. This practice was continued even after the rains came. Other cattle, not so treated, became severely affected.

II. The tendency to intensive grassland management has led to great change between the nature of the pasture from season to season. From recent experiences it appeared that stock which had suffered a hard summer were especially prone to facial eczema, while the owner who has poorly utilized his summer pasture and gone into the autumn with roughage had, on the whole, fared better.

L. suggests that control must be on herd and pasture management lines and that this should be possible without any very serious modification of existing methods and without loss in total production. Suggestions are made for the adjustment of farm management to meet the situation.—L. W. N. Fitch.

László, F. (1938). Óriásmáj borjakban. [**Pseudo-Cirrhosis of the Liver in Calves**]. —*Állatorv. Lapok.* **61.** 342-343.

Among 60,000 calves examined, L. found 3 cases of the disease. One was in a month-old calf weighing 49 kg. The liver weighed 3·1 kg., *i.e.* about three times the normal ; its colour and consistency were normal. Microscopic examination showed a slight increase of connective tissue and enlarged liver cells.

The other two livers weighed 5 kg. and 4·10 kg. respectively. The surface of both was yellowish-brown and smooth, the consistency was tough, and the surface on section was the same colour and diffusely indurated. Microscopic examination showed greatly increased quantities of connective tissue, and an increase in the number and size of the hepatic cells.

L. assumes that the condition was congenital malformation, as no other cause could be discovered.

Belt, T. J. (1939). **Liver Necrosis Following Burns, Simulating the Lesions of Yellow Fever.**—*J. Path. Bact.* **48.** 493-498. 4 figs. [18 refs.]

The uniform and distinctive picture found in the livers of four separate fatal cases of burns in healthy persons is described in detail. The pathological changes, which were decidedly more necrotic than inflammatory, consisted of hyalinization and fragmentation of liver cells, and assumed the form of a mid-zonal necrosis. Inclusion bodies were found in the nuclei, and in the cytoplasm were seen peculiar rounded hyaline condensations. As the lesions described are identical with those associated with yellow fever and similar to those found in many virus diseases, B. suggests that the character of the toxic agent present in burning fatalities resembles that which occurs in certain virus diseases.—J. R. Lawson.

Doenecke, H. (1939). Ungeklärte Pferdeerkrankung mit hoher Mortalität. [**An Obscure Equine Disease with High Mortality**].—*Tierärztl. Rdsch.* **45.** 497-502.

An account of a disease affecting 16 cart horses, the clinical symptoms being

hyperpyrexia and diarrhoea; six horses and a yearling colt died in spite of treatment. Full details of the autopsy findings and of the reports of chemical, bacteriological and clinical findings are given. It was finally considered that the cause was poisoning, in spite of the pyrexia observed and failure to identify any toxic agent.—E. G. WHITE.

KING, L. S. (1939). **Moose Encephalitis.**—*Amer. J. Path.* **15.** 445-454. 9 figs. on 2 plates. [17 refs.]

A disease in moose taking the form of a subacute or chronic encephalitis is described [see also *V. B.* **5.** 8]. The clinical symptoms exhibited by affected animals are unusual tameness, weakness and some incoordination of movement. Emaciation is frequently seen and sometimes peculiar movements of the head, ears, facial muscles, etc. The disease does not appear to have any seasonal incidence.

Parts of the brains and spinal cords of eight animals from different sources were studied. The characteristic lesions found were a slight loss of myelin, which was invariably perivascular and in practically all cases much less in extent than a fibro-gliosis. Considerable quantities of neutral fat were found in scattered parts of the white matter. In seven cases a mild type of inflammation was present in the white matter of the brain and cord, but in the remaining case this was observed in the grey matter. Inoculations with brain substance from one animal were carried out into sheep, kittens, mice and a pig, but the results were negative. K. discusses various possible aetiological factors.—J. R. LAWSON.

KUPPUSWAMI, P. S. (1937). **Some Observations on the Incidence and Inheritance of Imperforate Anus in Ganjam Calves.**—*Indian J. vet. Sci.* **7.** 305-308. [12 refs.] [Also appeared in *Indian vet. J.* (1939). **15.** 251].

During the year 1936-37, K. observed 105 cases of imperforate anus in his area. Two thirds of the cases were in bull calves. He suggests that the condition is hereditary and that the elimination of breeding stock suspected to transmit the character is the only remedy.—R. FISHER.

LAING, A. D. M. G. (1939). **"Sleepy Sickness" and Bearing Trouble [Prolapse of Vagina] in Ewes. Prevention by Suitable Methods of Management.**—*N.Z. J. Agric.* **58.** 465-470.

A popular article giving symptoms and treatment of these diseases. Emphasis is given to the fact that *ante-partum* paralysis or pregnancy toxaemia is a nutritional disorder and that farm management should be directed to lambing the ewes on a rising plane of nutrition.—L. W. N. FITCH.

BROWN, G. L., & HARVEY, A. M. (1939). **Congenital Myotonia in the Goat.**—*J. Physiol.* **96.** 11P-12P. [1 ref.]

The properties of muscles of affected animals [see *V. B.* **10.** 42.] are briefly summarized. The chief characteristics of the myotonic muscle are extreme sensitivity to mechanical stimulation and to potassium ions; the former is not diminished by curarization or by section of the nerve supply. A contraction results from tapping, stretching or the insertion of needle electrodes, and is due to a prolonged irregular tetanus in groups of fibres. Single motor nerve volleys cause a repetitive response, and the twitch tension developed is at least twice that of the corresponding muscle of a normal goat of similar weight. The amount of acetylcholine necessary to produce a given tension maximum is the same as for normal muscle, but the duration of the response is much greater.

The authors consider that the myotonia is due to an abnormality of the muscle fibre itself, and that the neuro-muscular transmitting apparatus is not directly involved.—Alastair N. Worden.

Lalas, B. (1939). Untersuchungen an makroskopisch nicht veränderten Eierstöcken nymphomaner Stuten. [**The Ovaries of Nymphomaniac Mares**]. —*Wien. tierärztl. Mschr.* **26.** 475-476.

Macroscopic cysts in the ovaries of mares do not necessarily distort ovarian contour. Consequently they cannot always be detected by rectal examination. It is nevertheless good treatment to carry out ovariectomy on affected mares.
—G. Williamson.

Pavšič, M. (1938). Prilog pitanju govedeg steriliteta u Dravskoj banovini s osobitim obzirom na infekciju s trihomonasima. [**Sterility in Cattle in Slovenia, Yugoslavia, with Special Reference to Trichomonas Infection**]. —*Vet. Arhiv.* **9.** 331-346. 3 tables. [Numerous refs.] [German summary].

P. gives an account of his experience of sterility in cattle in general, and, in particular, of cases where enucleation of the corpus luteum was indicated; in 246 cases so treated no trouble occurred from haemorrhage. [See *V. B.* **10.** 168].

Out of 117 cows with diseased genital tracts, *T. foetus* was detected in the vaginal or uterine secretions in 20 cases. Of these 20 cases there were six cases of vaginitis, three endometritis, and eleven of pyometra.—B. Oswald (Križevci).

Langermann, A. (1938). Hvad er Kaelvningsfeber? Iagttagelser over insulinbehandlede Tilfaelde. [**Nature of Milk Fever. Its Treatment with Insulin**]. —*Maanedsskr. Dyrlaeg.* **50.** 385-391.

L. discusses the question from the clinician's point of view, and his statements are based on his clinical experience, and not on scientific experiments. Taking into account Robin's statement [that the urine of cows suffering from milk fever contains up to 5% sugar or even more in severe cases, and that sugar appears in the cows' urine when they are not milked], L. suggests that milk fever in the cow, especially in the more severe cases which end fatally, in spite of inflation of the udder, may be diabetes. The cause of this would be retention of sugar in the blood, due to the inhibition of the outlet through the udder. He suggests that milk fever in the cow is consequently comparable with diabetic collapse in man. L. reports nine atypical cases of milk fever with convulsions and heart trouble which were treated, with good results, with 5 g. insulin in addition to inflation of the udder.

He considers that milk fever in cows to-day is more severe and causes more deaths than it did 30 years ago.—Gustav Naerland (Oslo).

Moutaux. (1939). Lésions des surrénales dans deux cas de tétanie d'herbage. Considérations pathogéniques. [**Adrenal Gland Lesions in Two Cases of Grass Tetany**].—*Rec. Méd. vét.* **115.** 220-225.

In two cows which died of grass tetany M. found lesions involving one of the adrenals. The first consisted of a large hypernephroma of the right adrenal and the second was a lymphosarcoma arising in the peri-renal tissue and enveloping and compressing the left adrenal. In the former case the liver showed fatty degeneration and focal necrosis. Other authors have stressed the frequency of pre-existing liver lesions in grass tetany, it being suggested that when the liver is damaged it is less able to withstand the factors responsible for the tetanus.

On the basis of these two cases, M. puts forward the hypothesis that grass tetany is the result of an auto-intoxication which only becomes serious in animals

with severe damage to the liver or adrenals, the organs mainly concerned in detoxication.—E. G. White.

Bullard, J. F. (1939). **Acetonaemia—Observations on Clinical and Non-clinical Cases.**—*Cornell Vet.* **29.** 377-383. 1 table. [2 refs.]

By the application of a modified Rothera's test to 589 samples of urine obtained from the University herd of dairy cattle, between the middle of February and April, over half the samples examined showed positive or suspicious indication of acetone bodies. Bad flavours had been encountered in considerable quantities in milk samples. Full details are given of 12 cases, most of which showed clinical symptoms of acetonaemia (loss of condition, anorexia, decrease of milk yield). There was, in general, good response to chloral hydrate and to intravenously injected glucose. By far the higher proportion of cases of acetonaemia (with and without clinical symptoms) occurred in recently calved cows. B. points out that acetonaemia of the dairy cow is much more common than is generally thought, although only a small proportion of cases may show visible clinical symptoms.—Alfred Eden.

Rowlands, W. T. (1939). **Poultry Diseases in North Wales. Reflections from Laboratory Observations.**—*Welsh J. Agric.* **15.** 306-310.

A semi-popular article. A brief description of poultry keeping in Wales is given. Reference has been made to fowl typhoid, bacillary white diarrhoea, fowl cholera, tuberculosis, infectious laryngo-tracheitis, fowl pox, parasitic infestation, coccidiosis, fowl paralysis, and blackhead, and suitable control measures are suggested. Vaccination against fowl typhoid did not produce agglutinins for *Salmonella pullorum*. R. discusses the possibility that fowl paralysis may be infectious and that it may be associated with a virus; he also refers to the role of nutrition in parasitic infestations.—S. G. Iyer.

—. (1938). **Discussion on Laryngotracheitis, Infectious Bronchitis and Coryza of Poultry.** [*Speakers*: Henry, M., Dobson, N., Cabot, D. A. E., du Toit, P. J., Olver, A., Downham, K. D., Datta, S. C. A., Schofield, F. W., Watson, E. A., Gordon, R. F., & Daubney, R.]—*Rep. 1st Imp. vet. Conf. Lond., 1938.* pp. 45-50.

H. commented on the occurrence and measures of control of avian infectious laryngotracheitis in Australia. The viruses of I.L.T. and avian infectious bronchitis could be differentiated by the inoculation of the allantoic membrane of hen's eggs, the virus of the former giving a distinctive growth and that of the latter killing the embryo in a few days. Dobson read a paper on the occurrence of I.L.T. in Great Britain, and stated that this disease had not been proved to exist in that country prior to January 1935, 38 outbreaks being confirmed in that year. Diagnosis was made in a suspected carcass by inoculation and immunity tests. Recommendations for controlling an outbreak consisted of slaughter of affected birds and isolation of in-contacts. No method of vaccination was employed. The disease occurred most frequently in large table-production and fattening plants. Some strains of the virus appeared to be of low virulence. The virus had not yet been recovered from organs other than the trachea and discharges from the nasal cavities and eyes. D. notes the difficulty in differentiating I.L.T. from other respiratory diseases. Infectious bronchitis, which affects chicks from two days to three weeks old, had not yet been proved to exist in Great Britain. Contagious catarrh was very prevalent in Great Britain, and in one outbreak the disease spread very rapidly through a farm and affected birds of all ages. Other speakers commented on the various respiratory diseases of fowls as they occur in different countries.—Hugh N. Spears.

Braga, A. (1938). Lymphomatose des poules. [**Fowl Paralysis**].—*Rep. 13th int. vet. Congr. 1938.* **2.** 838-846. 3 figs. [In French: English, German and Italian summaries. Discussion pp. 846-847 in English].

B. groups under the title of lymphomatosis, the leucaemias as well as true fowl paralysis, neurolymphomatosis gallinarum. In Brazil the disease has been found in certain provinces where the poultry industry is well developed. Nevertheless it appears to be uncommon, and its incidence is put at about 0·1 per 1,000. About 90% of cases of paralysis are due to helminthiasis and errors in feeding, and are not related to lymphomatosis gallinarum. Those cases which occur can be traced to the importation of pedigree stock from Europe or North America. In Brazil lymphomatosis gallinarum has not shown such virulence as in Europe and North America. The disease may be transmitted to healthy chicks by the inoculation of material free from organisms and cells.

In view of the low incidence of the disease in South America, B. considers it could be controlled by rigid inspection of imported stock at the ports of entry.

—D. L. Hughes.

Kolouch, F., Jr. (1939). **The Lymphocyte in Acute Inflammation.**—*Amer. J. Path.* **15.** 413-428. 12 figs. on 3 plates. [Numerous refs.]

It is abundantly clear from the literature that the lymphocyte plays an important part in the formation of acute inflammatory exudate. Nevertheless this function of the lymphocyte does not appear to be accepted by the majority of the authors of the modern textbooks of pathology. K. suggests that this discrepancy is due to the fact that many pathologists only study the later stages of the process of acute inflammation, when the derivation of the cells is no longer clear. He has studied this question by making successive biopsies of inflamed tissue from rabbits which had been inoculated subcutaneously with egg albumen. The inflamed material was teased out on slides and dried in the air. Haematological methods of staining were employed, as these gave the best cytological detail and allowed the differentiation of haematogenous and histogenous elements.

The first response of the rabbit in acute inflammation is the transformation of clasmatocytes to histogenous macrophages. The majority of the macrophages in an acute inflammatory process are of haematogenous origin. The transformation of the lymphocytes to macrophages occurs early in the inflammatory process. By the 14th hour the lymphocytic origin of the mononuclear cells in such exudate is obscured, and after the 18th hour cell lineage cannot be traced.—D. L. Hughes.

Schenck, M. (1939). Ueber gallensäurehaltige Konkremente und über die in der Natur vorkommenden Gallensäuren. [**Bile Acid Calculi and Bile Acid Occurring in Nature**].—*Berl. Münch. tierärztl. Wschr.* June 16th. 373-376. [Numerous refs.]

This is almost entirely a review of the literature dealing with the chemical composition of calculi containing bile acids obtained from man and various lower animals. Bile acids are found not only in biliary calculi but also occasionally in calculi occurring in the stomach and intestines. A large variety of bile acids has been isolated from the bile of different animal species; the significance of their chemical composition in relation to sterol metabolism is discussed.—E. G. White.

Jármai, K. (1938). A kutyák fertözö szájszemölcseiröl. [**Contagious Papilloma of the Mouth of Dogs**].—*Állatorv. Lapok.* **61.** 37-42. 7 figs. [13 refs.]

Experiments with the transference of mouth papilloma in dogs were successful not only with cellular material, but also with Berkefeld filtrate, though the growth

was less extensive after infection with the latter. With each transfer the virulence of the material decreased, and after four generations no further affection could be produced.

J. believes that the filtrable agent which provokes the growth is a "virus enzyme" produced by pathological changes of epidermic cells as a result of some irritant influence.

SITTNER, G. (1939). Ein sog. Mammamischtumor bei einem männlichen Hund und seine Histogenese. [**A "Mixed" Mammary Tumour in a Dog and its Histogenesis**].—*Arch. wiss. prakt. Tierheilk.* **74.** 406-410. 2 figs. [15 refs.]

S. records the finding in a 14-year-old male sheep-dog of a "mixed" mammary gland tumour. The growth, a discrete nodule the size of a pigeon's egg, was situated caudo-lateral to the preputial orifice. It was firm, and on section showed a lobular structure, with connective tissue septa passing into its substance from a peripheral fibrous capsule.

Within the lobules, four types of tissue were recognizable. There were epithelial cells with an adenomatous arrangement, syncytia of reticular epithelial cells, myxomatous-like material and tissue simulating cartilage. In places the reticular epithelium showed a tendency to form glandular alveoli, and elsewhere there were clear transitions between it and the chondroid and mucoid tissues. It was concluded that the epithelial cells originated from the tubulo-alveolar mammary glands and that development of much intercellular substance had given rise to areas resembling mucus and cartilage.

There was no true cartilage or bone in the tumour.—J. W. WHITTICK.

KATSURADA, F., & OKINO, T. (1938). Ueber Krebs bei Katzen. [**Cancer in Cats**].—*Gann.* **32.** 343-346. 7 figs. on 2 plates. [4 refs.] [In Japanese: German summary]. [Copied *verbatim* from *Amer. J. Cancer.* **36.** 620. Signed: W. NAKAHARA].

A case of mammary cancer in an old cat is described, with metastases in the lungs and liver.

AMIES, C. R., CARR, J. G., & PURDY, W. J. (1939). **Experiments on the des Ligneris Fowl Sarcoma.**—*Amer. J. Cancer.* **35.** 72-79. 2 tables. [19 refs.] [Authors' summary copied *verbatim*].

(1) A study has been made of the des Ligneris sarcoma—a filterable avian tumour which originated in a fowl inoculated with normal chicken fibroblasts which had been cultivated *in vitro* with dibenzanthracene.

(2) In its structure and behaviour this tumour closely resembles the Fujinami sarcoma. This view is considerably strengthened by the fact that cell-free extracts give rise to progressive tumours in ducklings. Ducks in which a des Ligneris tumour has developed and subsequently regressed are immune to the tumour agent of the Fujinami sarcoma.

(3) Various immunological experiments indicating that the des Ligneris tumour is related to Rous sarcoma No. 1 are compatible with this belief.

ANDREWES, C. H. (1939). **The Occurrence of Neutralizing Antibodies for Rous Sarcoma Virus in the Sera of Young "Normal" Chicks.**—*J. Path. Bact.* **48.** 225-227. 1 table. [8 refs.]

Sera obtained from 24-48 hour-old chicks were shown to inactivate Rous sarcoma virus completely. The serum of the parent bird also had neutralizing

properties. These circulating antibodies from the chicks disappeared in about 14 days. The immunity possessed by such chicks was not striking.

Emulsions of the yolks of eggs from hens with circulating neutralizing antibodies inactivated Rous filtrates; this was not true of the white of such eggs. Yolks from hens with no circulating antibodies failed to inactivate the virus. Such antibodies appeared to be transmitted through the egg.

Experiments designed to test this point indicated that it was unlikely that development of antibodies in later life depends upon inherited factors. Chicks with circulating neutralizing antibodies in early life showed no tendency to develop such antibodies in later life.—L. E. Hughes.

Kiyono, K., & Tomita, T. (1937). Ein Fall von histiocytärer Geschwulst (Fibrohistiocytom) bei der Ratte. [**A Case of Histiocytic Tumour (Fibrohistiocytoma) in the Rat**].—*Gann.* **31.** 216-218. [In German: Japanese summary]. [Abst. in *Amer. J. Cancer.* **36.** 308, copied *verbatim.* Signed: K. Sugiura].

Among a large number of rats fed with o-amido-azotoluene the authors discovered one histiocytic tumor growing in the subcutaneous tissue on the 180th day. The tumor showed trypanosome infestation. In the protoplasm, lipoids and cholesterol were found. In only one variety of tumor cells, *i.e.*, histiocytic cells, were trypanosomes enclosed. Transplantation of this tumor into normal rats was unsuccessful.

Baumann, C. A., & Rusch, H. P. (1939). **Effect of Diet on Tumors Induced by Ultraviolet Light.**—*Amer. J. Cancer.* **35.** 213-221. 7 tables. [Numerous refs.] [Authors' summary copied *verbatim*].

Tumors were produced by means of ultraviolet light in albino mice kept on five standard diets. The rate of tumor production varied on the different diets. Tumors were produced most rapidly on a high-fat diet, whereas brain extract or liver retarded tumor production. Addition of 2 per cent. cholesterol to the stock diet did not affect the rate of tumor production, although a marked increase in liver fat and cholesterol resulted. No relation appeared to exist between the cholesterol content of blood, liver, kidneys, ear, or skin, and the production of tumors on the various diets. The results suggest that the rôle of cholesterol in tumor production is a limited one. The cholesterol content of skin was increased by irradiation in the rat, but not in the mouse or guinea-pig. The increase appeared to be due to systemic changes.

Baatz, H. (1938). Karzinomwachstum und Schwangerschaft. Experimentelle Studien am Spontan- und Impftumor der Maus. [**Pregnancy and the Growth of Carcinoma. Experimental Studies on Spontaneous and Transplantable Mouse Tumours**].—*Z. Geburts. Gynäk.* **118.** 124-162. [Abst. in *Amer. J. Cancer.* **36.** 129-130, copied *verbatim.* Signed: Wm. H. Woglom].

The Ehrlich mouse carcinoma was inhibited when inoculated during the second third of pregnancy, and still more so if implanted in the last third. When conception and inoculation coincided there was a slight decrease in the percentage of takes but no effect upon the growth of the tumor. If pregnancy occurred in a mouse bearing an established tumor the growth of the neoplasm was generally not affected. Spontaneous mouse carcinomas, on the other hand, were definitely stimulated by pregnancy, and pursued a particularly unfavorable course during the post-partum period.

MIDER, G. B., & MORTON, J. J. (1939). **The Effect of Freezing *in vitro* on some Transplantable Mammalian Tumors and on Normal Rat Skin.**—*Amer. J. Cancer.* **35.** 502-509. 3 figs., 1 table. [17 refs.] [Authors' summary copied *verbatim*].

Walker rat carcinoma 246 and mouse sarcomata 180 and 37 grew on subcutaneous transplantation after exposure to –74°C. *in vitro*. The effects of the rate of freezing, duration of the frozen state up to twenty-four hours, the number of repeated freezings and thawings, and the physical state of the tumor are discussed.

The squamous epithelial and connective-tissue cells of normal adult rat skin may grow after a single freezing to –74°C.

I. HADDOW, A. (1938). **The Biological Characters of Spontaneous Tumours of the Mouse with Special Reference to the Rate of Growth.**—*J. Path. Bact.* **47.** 553-565. 4 figs., 1 table. [Numerous refs.]

II. HADDOW, A. (1938). **The Influence of Carcinogenic Compounds and Related Substances on the Rate of Growth of Spontaneous Tumours of the Mouse.**—*Ibid.* 567-579. 11 figs., 1 table. [16 refs.]

III. HADDOW, A. (1938). **The Influence of Carcinogenic Substances on Sarcomata by the Same and other Compounds.**—*Ibid.* 581-591. 6 figs., 4 tables. [12 refs.]

I. Data concerning the normal behaviour of spontaneous tumours (336 mammary carcinomata and 5 others) in mice are subjected to statistical scrutiny. Growth rate of the tumours was faster in the caudal four mammae than in the others (due to vascular supply). The greater the degree of cell differentiation, the slower was the rate of growth. Bacterial infection and lactation lowered the rate, while gestation had no effect. The occurrence of metastases was found to be correlated to the size and to the duration of the primary, whereas it had no significant association with the rate at which tumours grew, location or number of primaries.

II. Variable degrees of growth inhibition (from slight retardation to active complete regression) were produced by parenteral injections of carcinogenic substances (1:2:5:6:-dibenzanthracene, 1:2:5:6-dibenzacridine, styryl 430, and acenaphthanthracene). Of non-carcinogenic compounds, pyrene and 1:2:3:4-dibenzanthracene were without effect or caused only transient interference, while 1:2:5:6-dibenzphenazine had an inhibitory action. Oestrone benzoate acted similarly to the non-carcinogenic compounds.

[H. in this paper coupled acenaphthanthracene with 1:2:5:6-dibenzphenazine as a non-carcinogenic substance producing inhibition. It was later proved to be carcinogenic].

III. Chemically induced sarcomata are much less susceptible to the inhibitory action of carcinogenic hydrocarbons than are transplanted or spontaneous tumours of the mouse. This relative resistance is not specific; tumours induced by one carcinogenic compound showed no significant difference in their resistance to the same or another compound. That the inhibitory action of carcinogenic substances on transplanted and spontaneous growths is not due to an adverse effect on the health of the host is also proved by results obtained in these experiments.—J. W. W.

FRANKS, W. R., & CREECH, H. J. (1939). **Chemoantigens and Carcinogenesis: I.**—*Amer. J. Cancer.* **35.** 203-212. 2 figs., 1 table. [15 refs.] [Authors' summary copied *verbatim*].

Immunization of stock white mice with dibenzan-thranyl-carbamido-casein antigen gives evidence of reducing their susceptibility to carcinogenesis from injected dibenzanthracene as compared with untreated controls.

NUTRITION IN RELATION TO DISEASE

BARTLETT, A., COTTON, A. G., MACKINTOSH, J., CRICHTON, J. A., & BIGGAR, W. A. (1938). **Milk and Nutrition. New Experiments Reported to the Milk Nutrition Committee. Part III. The Effect of Commercial Pasteurisation on the Nutritive Value of Milk as Determined by Experiments on Calves. From the National Institute for Research in Dairying (University of Reading) and the Rowett Research Institute, Bucksburn, Aberdeen.** pp. 27. 16 tables, 3 graphs. Shinfield, Reading : National Institute for Research in Dairying. [4to] [2s.]

This report continues the series of investigations on the effect of commercial " holder " pasteurization on the nutritive value of milk. [For previous report, see *V. B.* **8.** 612]. In the present investigation three complete experiments were carried out, using calves as the experimental animals. In each experiment there were two similar groups of calves receiving identical treatment, except that one group was fed on commercial raw milk, and the other on the same quantity of commercially pasteurized milk from the same bulk as the raw milk. In one experiment there were no statistical differences in live weight, in appearance, or in blood composition, as between animals fed on raw and those fed on pasteurized milk. The other two experiments suggest a slight advantage to the calves on raw milk in so far as growth rate is concerned, but not as regards body measurements, general health, or blood composition. When all three experiments are combined statistically, no statistical difference is shown between the effects of raw and of pasteurized milk on growth. It is concluded that any deleterious effect of pasteurization, as detectable by calf experiments of the type described, is of a minor kind. The milk fed to the calves was examined for the presence of tubercle bacilli. In one lot 29·6% of raw milk samples were found to be infected, and in another lot 74% were infected. In addition 7% of one lot of pasteurized milk was infected.

The tuberculin test was applied to all calves which completed the experiments, at about six months of age. Taking the results of the three experiments together, 17 out of 37 calves in the raw milk group (46%), and 5 out of 38 in the pasteurized milk group (13%), gave a positive tuberculin reaction.—N. J. SCORGIE.

I. ANON. (1938). **Raw and Pasteurized Milk.**—*Brit. med. J.* Nov. 19th. 1049-1050. [1 ref.]

II. WILSON, G. S. (1938). **The Phosphatase Test and Pasteurization. [Correspondence].**—*Ibid.* Nov. 26th. 1109. [1 ref.]

I. A leading article concerning experiments on the milk feeding of calves at the National Institute for Research in Dairying, the Rowett Research Institute, and elsewhere [see preceding abstract].

" In both these experiments the average gain in weight of the animals was either equal or slightly higher in the pasteurized than in the raw group. The Reading and Aberdeen workers seem to have fallen between two stools. Some of their animals came from tuberculin-tested herds and others did not. Ordinary raw and pasteurized milk were given, but the animals were all housed together." " . . . there is a great deal to show that the serious risk of developing tuberculosis and possibly pneumonia incurred by calves fed on ordinary raw milk can be more or less completed avoided by adequate pasteurization of the milk and protection of the calves from other sources of infection."

II. Commenting on the above, W. points out that a positive phosphatase test proves that the milk has not been effectively pasteurized but that, since the test cannot detect smaller quantities than 0·2% of raw milk, a negative test does not exclude the presence of tuberculosis.—H. E. BYWATER.

Mitchell, H. H., & McClure, F. J. (1937). **Mineral Nutrition of Farm Animals.** —*Bull. nat. Res. Coun., Wash.* No. 99. pp. 135. 16 tables, 1 appendix. [Numerous refs.]

An admirable critical review of existing knowledge which every worker on nutrition of farm animals could usefully add to his shelves for ready reference. The subject matter is dealt with in five sections :– (a) Mineral supply in farm feeds. (b) Evidences of mineral malnutrition in animals ; deals with sodium and chlorine, calcium and phosphorus, magnesium, iodine, iron and copper, manganese, cobalt, zinc, fluorine, selenium, natural waters. (c) Availability and utilization of minerals ; vitamin D, mineral ratios, intestinal reactions, acid-base balance of ration, fluorine toxicosis, organic constituents of feeds, mineral supplements, utilization of minerals in feeds. (d) Mineral requirements of farm animals ; requirements for maintenance, requirements of calcium and phosphorus for poultry, swine, cattle, sheep and horses, requirements for iron and copper, salt, other minerals, and water. (e) Practical considerations in balancing rations for growth and production of live stock on the farm.

The appendix supplies 16 useful tables, including organic and mineral analysis of feeds, estimated requirements of calcium and phosphorus for different classes of stock, and coefficients for calculating water requirements of an individual from surface area.—H. H. Green.

Sjollema, B. (1938). De anorganische stoffen in het gezonde en zieke dier. **[Inorganic Compounds in Healthy and Sick Animals].**—*Tijdschr. Diergeneesk.* **65.** 589-610.

An address given on the retiral of Prof. Sjollema from Utrecht University, which takes the form of a critical and speculative survey of the wide field indicated by the title, and should therefore be read in the original. The author's own views on milk fever, grass tetany, and the significance of trace elements in nutrition, are incorporated.—H. H. Green.

Archibald, R. M., & Hancock, E. E. I. (1939). **Iron Deficiency as the Probable Cause of Stillbirth in Swine.**—*Canad. J. comp. Med.* **3.** 134.

The feeding of reduced iron in half-teaspoonful doses, twice daily for two weeks, and once daily for one week, corrected anaemia in several sows which had given birth to dead litters. Ultimately the sows farrowed normal litters. There were no controls.—L. M. Heath.

Day, H. G., & McCollum, E. V. (1939). **Mineral Metabolism, Growth, and Symptomatology of Rats on a Diet Extremely Deficient in Phosphorus.**— *J. biol. Chem.* **130.** 269-283. 3 tables. [Numerous refs.]

Rats were fed on a very low P diet, prepared according to specific instructions, and grew slowly for five or six weeks, declining or dying two or three weeks later. Symptoms included progressive disability in standing, walking and breathing. Metabolism balance studies on such a diet were made. No significant changes occurred in Na, K, Mg and Cl balances. For five weeks N retention was positive, becoming negative with the beginning of the loss of weight. The tremendous loss of Ca occurred mainly through the urine, whilst that of P was in the faeces, indicating that a significant amount of P mobilized from the bones was redeposited in the soft tissues in spite of the continuous negative P balances.

Relevant literature, especially as regards the influence of vitamin D under such conditions of low P intake, is discussed in the light of the data supplied. —Alfred Eden.

Trautmann, A. (1937). Beobachtungen an der Thymusdrüse lecksuchtkranker Rinder. [**The Thymus of Cattle Affected with Pica**].—*Dtsch. tierärztl. Wschr.* **45.** 637-639. 5 figs.

A few young bovines were studied in various stages of the disorder " lecksucht ", as occurring in Schleswig-Holstein. Four photographs show the stunting of growth during life and three photomicrographs show histological changes and degeneration in the thymus, but T. is not prepared to say whether these are primary or secondary.—H. H. Green.

Mahajan, M. R. (1937). **The Incidence of Osteomalacia in Cattle in India and Its Control.**—*Proc. Anim. Husb. Res. Wkrs Conf. India, 1936.* pp. 23-26. Discussion pp. 26-27. 1 table. [7 refs.]

The discussion revealed the need for organized research on the diseases of Indian livestock due to mineral deficiencies. Osteomalacia of cattle is said to occur in Hyderabad State and also in the Madras Presidency. There was discussion concerning the establishment of a Central Animal Nutrition Institute at Izatmagar which would facilitate research on the subject in collaboration with the staff of the Imperial Institute of Veterinary Research at Muktesar. [This Institute has since been opened].—J. A. Griffiths.

Blumberg, H., Shelling, D. H., & Jackson, Deborah A. (1938). **The Production of Manganese Rickets in Rats.**—*J. Nutrit.* **16.** 317-324. 4 tables. [13 refs.] [Authors' summary copied *verbatim*].

1. " Manganese rickets " has been produced in rats by the substitution of an equimolar amount of manganese carbonate (2·9 %) for 2·5 % of calcium carbonate in a high calcium-low phosphorus rachitogenic diet, and also by the addition of 2·9 % of manganese carbonate to a stock diet of optimal calcium and phosphorus content.

2. A soluble manganese salt, manganous chloride, was rachitogenic, but the more difficultly soluble manganese dioxide was not.

3. Vitamin D was effective in curing " manganese rickets " when added to a diet optimal in calcium and phosphorus, but only slightly effective when added to a diet low in both calcium and phosphorus.

Bowness, E. R. (1938). **Vitamins. With Reference to Fur Bearing Animals.**—*Canad. J. comp. Med.* **2.** 200-205.

Deficiency of vitamin A is responsible for inflammatory conditions of the eye, death of the young, and calculi. Vitamin B is important in connexion with reproduction and digestion. Foxes and mink do not have scurvy, and if there is a lack of vitamin C any ill effects must be otherwise manifested. Lack of vitamin D is responsible for rickets. A balanced ration, as generally employed, contains vitamin E. Knowledge of vitamin requirements in other animals and what is known of the natural diet of fur-bearers offers a theoretical basis for supplying certain accessory factors in a ration for the latter.—R. Gwatkin.

Mouriquand, G. (1939). Sur l'avitamino-résistance. [**Resistance to Avitaminosis**].—*C. R. Acad. Sci., Paris.* **208.** 310-312. [2 refs.]

During more than twenty years work on vitamin C deficiency in g. pigs, it has been noticed that some, among animals of the same age, history, treatment, etc., show a remarkable resistance to a lack of vitamin C, the symptoms developing much later than usual. Cases of acute avitaminosis C are rare, but partial avitaminosis C is common in animals. At present there is no satisfactory explanation

of this peculiarity of certain cases. This peculiarity may well exist in human beings and should be investigated. [See also *V. B.* **10.** 48].—E. I. McDougall.

Russell, W. C., & Morris, M. L. (1939). **Vitamin A Deficiency in the Dog. 1. Experimental Production of the Vitamin A Deficient Condition.**—*J. Amer. vet. med. Ass.* **95.** 316-320. 4 figs., 2 tables. [4 refs.]

Two 7-weeks-old mongrel puppies were given a diet consisting of cooked rolled oats, 54·2 parts; casein, extracted with 95% alcohol for 15 hours, 8·4; meat scrap, containing 55% protein, 8·4; cane sugar, 9·3; dried yeast, 8·4; Crisco, 5·4; $CaCO_3$, 3·4; $Ca_3(PO_4)_2$, 1·7; NaCl, 0·8; this was supplemented by sufficient irradiated dry yeast to supply 500 U.S.P. units of vitamin D per day. After about three weeks, growth became impaired, and both the Hb value and the red corpuscle count of the blood were lowered. Iron and copper therapy was instituted, and the daily ration was supplemented by 1 mg. of aneurin. The blood picture gradually returned to normal, but growth, although rapidly resumed, was maintained for a few days only. By the seventh week of the experiment, it was considered that a typical vitamin A deficiency had been produced. A resumption of growth, lasting over several weeks to the end of the experiment, was elicited by the administration of carotene, but the quantitative requirements of the two animals for this supplement appeared to differ.—Alastair N. Worden.

Reiser, R. (1939). **Lipid Changes in Nerve Degeneration in Avitaminosis A. Lipids of Sciatic Nerve in Avitaminosis A.**—*J. Lab. clin. Med.* **24.** 701-708. 3 tables. [Numerous refs.]

An acetone-soluble material, not cholesterol, was found in the sciatic nerves in albino rats. There was a decrease in the saturated conjugated lipids, calculated as sphingomyelin and kerasin, during nerve degeneration due to lack of vitamin A, but there was no decrease in lecithin and cephalin.

Bound cholesterol was found in nerve tissues; free cholesterol does not change significantly during this nerve degeneration. The article gives a detailed account of the analytical method involved.

Arnold, A., & Elvehjem, C. A. (1939). **Is Running Fits a Deficiency Disease.**—*J. Amer. vet. med. Ass.* **95.** 303-308. 4 figs., 1 table. [13 refs.]

Dogs fed a simplified diet composed of wheat and meat scraps which was subjected to dry heat in a retort kept above 200°C., developed "running fits" in 8-18 days. This condition was prevented in one animal by the addition to the diet of 10% purified casein for a period of 60 days, but eight days after the withdrawal of the casein supplement the dog developed "running fits". The addition of 10% dry canned dog food, known to be a complete ration, was insufficient to prevent the onset of the disorder, but when this amount was increased to supply approximately 10% of protein to the heated ration, running fits did not occur. Preliminary results obtained after injection and ingestion of lysine dihydrochloride indicated that the corrective action of the protein supplements was dependent largely on the added supply of lysine. [This is the same condition as canine hysteria].—A. Allcroft.

Kohn, H. I., Klein, J. R., & Dann, W. J. (1939). **The V-Factor Content and Oxygen Consumption of Tissues of the Normal and Blacktongue Dog.**—*Biochem. J.* **33.** 1432-1442. 2 figs., 4 tables. [Numerous refs.]

Acute blacktongue was produced in adult dogs by feeding on a modified Goldberger diet, supplemented by shark-liver oil and aneurin. The liver and striated muscle of these animals were found to contain only 30% and 65% as

much " V-factor " respectively as the corresponding tissues of normal animals, whereas in animals in which the blacktongue had been cured by nicotinic acid therapy, the values were intermediate. In the case of the blood and other tissues examined, the differences were small or non-existent, and the authors are of the opinion that the evidence indicates that the disease is not due to a generalized depletion of co-enzyme-like substances throughout the body tissues.

An increase in the rate of oxygen-consumption by the liver-tissue, and a decrease in the ability of the kidney-tissue to oxidize lactate, were also noted in the case of the deficient animals.

[" V-factor " is essential for the growth of *Haemophilus para-influenzae*, by means of which it is assayed. Of known compounds, only the di- and tri-phospho-pyridinenucleotides, *i.e.* nicotinamide-containing co-enzymes, have been shown to possess this activity].—Alastair N. Worden.

I. Phillips, P. H., & Engel, R. W. (1938). **Neuromalacia Associated with Low Riboflavin Diets, a Preliminary Report.**—*Poult. Sci.* **17.** 463-465. 1 fig. [10 refs.]

II. Engel, R. W., & Phillips, P. H. (1939). **Effect of Riboflavin-Low Diets Upon Nerves, Growth and Reproduction in the Rat.**—*Proc. Soc. exp. Biol., N.Y.* **40.** 597-598. [3 refs.]

I. An histological study of acute " curled toe paralysis " in chicks fed a low riboflavine diet showed that neuromalacia was present in the sciatic and brachial nerves. Myelin swelling and degeneration, Schwann cell proliferation, and axis cylinder fragmentation in the affected nerves were observed, as also were myelin degeneration and axis cylinder swelling in the spinal cord. Neurofibrillal fragmentation, chromatolysis, and other degenerative changes were present in the nerve cells of the brachial segment of the cord ; these changes were accompanied by gliosis. Neuromuscular end-plates were affected in some instances and a few cases exhibited muscle degeneration and atrophy. The administration of 300 γ of flavine per 100 g. of ration largely prevented the development of neuromalacia and the accompanying pathological processes.

II. Rats maintained on a riboflavine-low ration did not develop the severe nerve degeneration which is characteristic of growing chicks fed a similar diet. This ration had no adverse effect on reproduction in the rat, but the rate of growth indicated that a growth-promoting factor was lacking ; addition of nicotinic acid did not improve the ration.—R. Allcroft.

Fritz, J. C., Archer, W., & Barker, D. (1939). **Riboflavin Requirements of Ducklings.**—*Poult. Sci.* **18.** 449-454. 3 tables. [12 refs.]

The results of feeding tests indicated that the riboflavine requirements for optimum growth of ducklings during the first eight weeks was about the same as for chicks *viz*, about 300 per 100 g. feed. During the experiment a large number of the ducklings fed a semi-purified diet, developed a leg deformity believed to be of nutritional origin. Ducks taken immediately from experimental diets which included 6% fish meal and 2% cod liver oil had a fishy odour and flavour when cooked, but this was corrected by eliminating these two constituents from the diet for six days before the birds were killed.—R. Allcroft.

Sinkó, F. (1936). A szarvasmarha egyes szerveinek ascorbinsavtartalmáról. [**Ascorbic Acid Content of Certain Organs of Healthy Cattle**].—*Thesis, Budapest.* pp. 15. 5 tables. [Numerous refs.] [German summary].

The organs examined were the corpus luteum (average ascorbic acid content

166·45 mg. %), calf thymus (168·17 mg. %), hypophysis (134·32 mg. %), adrenal cortex (143·44 mg. %), liver (49·53 mg. %), pancreas (77·53 mg. %), ovary (73·34 mg. %), spleen (36·70 mg. %), muscles of the limbs (7·28 mg. %), and muscles of the rumen wall (23·15 mg. %), showing that endocrine glands contain considerably more ascorbic acid than other organs.

JOHNSON, D. W., & PALMER, L. S. (1939). **Individual and Breed Variations in Pigs on Rations Devoid of Vitamin D.**—*J. agric. Res.* **58.** 929-939. 9 tables. [9 refs.]

This paper deals with a series of 3 experiments which were carried out on housed pigs in Minnesota during separate winters between 1934 and 1937. The basal diets employed consisted principally of yellow maize (86-87 %) and tankage [swill] (11-12 %), together with small mineral supplements and yeast, and had a Ca/P ratio of 1·65 with a P content of 0·63-0·65 %.

In the first experiment, in which coloured pigs were used, the plasma-Ca values of animals on the deficient rations had fallen to between 5·23 and 7·08 mg. per 100 c.c. by the seventh week, whereas controls receiving irradiated yeast showed only very slight falls in plasma-Ca. The deficient animals are stated also to have had harsh coats and unthrifty appearances, although their average weight increase seems to have approximated that of the controls; substitution of 0·15 % irradiated yeast for the similar amount of unirradiated yeast present in the diet resulted in a rise of plasma-Ca to an average of 11 mg. per 100 c.c. The plasma-inorganic P values did not undergo any marked change throughout.

The second and third experiments were conducted on similar lines, but involved a comparison of white with coloured pigs; in the case of the former, the plasma-Ca level was found to fall much more slowly. Access to sunshine was found to restore to normal the condition of certain clinically affected animals.—A. N. WORDEN.

REED, C. I. (1938). **On the Nature of the Toxic Action of Vitamin D.**—*Proc. Soc. exp. Biol., N.Y.* **38.** 791-792. 1 table.

Feeding trials extending over 15 days were carried out with four groups of dogs, each of which contained 12-14 healthy, full-grown animals of comparable weight. The first group received an ergosterol preparation which had been irradiated in ether solution with a quartz mercury vapour lamp, and which contained 9 million units of vitamin D per g. of original ergosterol. The second group received material from the same source, which had been further irradiated until its vitamin D content was only 3 million units per g. of original substance. The third group was dosed with a sample of calciferol in oil which had been allowed to decompose in a warm room, and the fourth group with large quantities of an unaltered vitamin D preparation named " viosterol ".

The dogs in the first three groups were receiving daily intakes of vitamin D equivalent to 12,000, 4,000 and 800 units per kg. bodyweight respectively; the majority of them were showing " definite symptoms of intoxication " by the end of the fifteen-day period. The animals of the fourth group, however, although receiving daily the equivalent of 200,000 units of vitamin D per kg. body-weight, remained in normal health throughout. It is therefore suggested that the toxicity associated with large dosages of vitamin D preparations is due to the presence of decomposition products and not to the vitamin itself.—ALASTAIR N. WORDEN.

KNOWLTON, G. C., HINES, H. M., & BRINKHOUS, K. M. (1939). **Effect of Wheat Germ Oil upon E-Deficient Muscular Dystrophy.**—*Proc. Soc. exp. Biol., N.Y.* **41.** 453-456. 1 table. [5 refs.]

Muscular dystrophy was produced in rats by feeding from birth a diet deficient

in vitamin E. At the age of five months, muscle necrosis and muscle regeneration were evident histologically and chemical studies showed an increase in the chloride and water concentrations of the muscles. Subsequent addition of wheat germ oil or vitamin E concentrate to the diet for 2-3 months resulted in complete recovery with respect to the concentration of chloride and water in the muscles and histological examination revealed practically no evidence of necrosis. In spite of these signs of recovery, the muscles still lacked the ability to develop the normal amount of tension when tested by quantitative methods.—R. Allcroft.

I. Evans, H. M., Emerson, Gladys A., & Telford, Ira R. (1938). **Degeneration of Cross Striated Musculature in Vitamin E-Low Rats.**—*Proc. Soc. exp. Biol., N.Y.* **38.** 625-627. 2 figs. [7 refs.]

II. Telford, Ira R., Emerson, Gladys A., & Evans, H. M. (1939). **Histological Changes in Skeletal Musculature of Paralyzed Suckling Young of E-Low Rats.**—*Ibid.* **41.** 291-295. 4 figs. on 1 plate. [11 refs.]

I. Six rats born of normal mothers were maintained on an E-deficient diet from weaning until their destruction at 22 months of age, undergoing one gestation period. Symptoms of the characteristic locomotor disability or partial paralysis were usually evident at 15 months, and were marked at the time of destruction, when the average weight was 252 g. as compared with the 335 g. of five control animals maintained on a stock diet. Histological examination of the gastrocnemius muscles of the affected animals showed marked degeneration, with infiltration of leucocytes and connective tissue elements, reduction in both longitudinal and cross striation, and nuclear changes.

II. Of a total of 151 rats from young mothers which had been completely deprived of vitamin E, except for a single dose of 1 g. of wheat germ oil on the day of the second positive mating, 81 were allowed to suckle without supplement—50 developing some degree of paralysis—while 70 were provided with doses of wheat germ oil. At three weeks of age, all the animals were killed, and their gastrocnemius and soleus muscles were removed. In the case of the 70 treated rats, lesions were not demonstrated, but the muscles of the deficient animals revealed, on histological examination, varying degrees of degeneration. The authors describe the changes as being characterized by (a) a degenerative, and (b) a regenerative stage, the former consisting firstly of Zenker degeneration, followed by an infiltration of leucocytes and connective tissue elements. The severity of the lesion is stated to follow the clinical picture, early changes being found prior to the appearance of symptoms, and regeneration being found in those animals which have made spontaneous recoveries.—Alastair N. Worden.

Clark, R. L., Dixon, C. F., Butt, H. R., & Snell, A. M. (1939). **Deficiency of Prothrombin Associated with Various Intestinal Disorders: Its Treatment with the Antihemorrhagic Vitamin (Vitamin K).**—*Proc. Mayo Clin.* **14.** 407-416. 3 figs. [9 refs.]

The case reports are given of eight human patients with low levels of prothrombin or increased prothrombin times; vitamin K concentrates were successfully utilized in the treatment of four of the patients. The authors postulate that the following conditions are necessary to ensure adequate vitamin K metabolism:—(1) adequate amounts of the antihaemorrhagic factor, or of its precursor, in the diet; (2) the presence in the intestine of bile of normal composition; (3) proper fat digestion; (4) a normal absorptive surface in the small intestine, and (5) satisfactory utilization of the absorbed factor by the liver. If any of these conditions is improperly fulfilled, prothrombin deficiency may ensue.—Alastair N. Worden.

PUBLIC HEALTH

GLOYNE, S. R. (1939). **Testing Milk for Tubercle Bacilli.**—*Lancet.* **237.** 137.

Reference is made to advantages and disadvantages of testing milk for tubercle bacilli, by microscopic examination of centrifuged deposits, cultural examination, and g. pig inoculation. The author states that g. pig inoculation is the most reliable method.—J. R. LAWSON.

FITCH, C. P., & BISHOP, Lucille M. (1939). **Detection of Contamination of Raw Market Milk with Brucella Abortus.**—*Cornell Vet.* **29.** 410-415. 2 tables. [2 refs.]

The authors carried out tests for the presence of *Br. abortus* in the bulk raw milk as supplied to the consumers in one city. *Br. abortus* was isolated from all the milk samples with a titre of 1:25, and in some samples showing no agglutination at this dilution. A description is given of the methods used to determine if agglutinins in the milk in dilutions lower than 1:25 were significant of herd infection. The herd status was compared with the results found on the agglutination titre of the milk. Milk samples with a titre of 1:25 or higher were found to come from herds whose average herd infection was 14%, while samples in which no agglutinins could be demonstrated came from herds in which the average herd infection was 3%. The authors consider that city and public health laboratories should have some convenient method for checking the presence of *Br. abortus* in raw milk samples.—F. T. BOYLE.

TREFFENSTÄDT, W. (1938). Ueber den färberischen Nachweis der Brucellen in der Milch. **[Staining Methods for the Demonstration of Brucella in Milk].** —*Inaug. Diss., Giessen.* pp. 35. 9 tables. [Numerous refs.]

T. tested various staining methods for the demonstration of *Br. abortus* in milk without the aid of enrichment methods, the gravity cream and sediment obtained by centrifugation and by addition of agglutinating serum being used.

The following is his method of choice :– fix whole milk smears by heat, or cream smears by 90% alcohol, stain for three minutes with 3% aqueous safranin heated until it steams, wash in water, differentiate with 1% acetic acid, wash, counterstain with 1% aqueous methylene blue for about one minute; wash and dry. Sediment obtained by centrifuging for 20-30 minutes is richer in bacilli than gravity cream. Still greater enrichment is obtained if specific agglutinating serum is used, followed by centrifugation.—W. F. BENJAMIN.

ROWLANDS, A. (1939). **The Udder as a Possible Source of Coliform Organisms in Milk.**—*J. Hyg., Camb.* **39.** 454-462. 5 tables. [Numerous refs.]

The author deals with the subject under three headings, (1) coliform organisms associated with mastitis, (2) contamination of milk with coliform organisms following injury to the udder, and (3) coliform organisms in milk from apparently normal udders, and gives a comprehensive review of the relevant literature. Under the first heading it is shown that infection of the udder with coliform organisms is rapidly followed by the onset of the symptoms of mastitis and marked changes in the character of the milk, while under the second, several examples are given of contamination of the milk having taken place following injury to the udder or teats. Some interesting details are provided in the third section; it is proved that certain cows may be capable of harbouring infection in the udder and of excreting infected milk for considerable periods. In cases of this kind it was found that there was a complete absence of clinical symptoms and no noticeable

changes took place in the character of the milk. Clinical examination failed to reveal any difference between infected and non-infected quarters, and infection was only proved by individual sampling.—J. R. Lawson.

Trimble, C. J., & Brothwood, W. C. V. (1938). **An Outbreak of Sonne Dysentery.**—*Brit. med. J.* Dec. 31st. 1365-1366. 1 table, 1 graph.

It was concluded that this outbreak of Sonne dysentery was milk-borne, since infected persons were consumers of milk from the same farm, but no evidence that this was the origin was obtained. Although 81 persons were exposed to infection, only 24 became infected. Prompt administrative action put a stop to the outbreak, but two secondary cases occurred. Tables of faecal examinations show that the organism was present in most cases for 7-8 days, but not 14 days after the attack. The water supplies were shown to be markedly polluted by organisms of the *coli-aerogenes* group, but *Bacterium sonnei* was not isolated therefrom.

—H. E. Bywater.

van Oijen, C. F. (1938). Overzicht van de in een viertal landen thans geldende bepalingen, omtrent de keuring van slachtdieren lijdende aan tuberculose. [**Meat Inspection Regulations for TB. in France, Scotland, Germany and Holland**].—*Tijdschr. Diergeneesk.* **65.** 377-391.

The author compares the meat inspection regulations for TB. in France, Scotland, Germany and Holland. Points common to the regulations of all these countries are (1) a tuberculous visceral organ is condemned as a whole in certain circumstances, and (2) the organs of which the corresponding lymph nodes are tuberculous are always condemned. There are important differences in the standards for judging animals with generalized TB. The Scottish regulations insist on the destruction of the entire animal in all cases of generalized TB., irrespective of the character of the lesions. In Germany carcasses of such animals are sold as *minderwertig* (poor quality) with certain restrictions. In Holland the carcass is destroyed if the animal has been slaughtered in emergency. According to the author, all these regulations concerning the disposal of carcasses in which generalized TB. is found require amendment.

The differences in regulations regarding TB. of the bones are very great; according to the Dutch regulations all the bones must be condemned if any are affected; the French and Scottish regulations are silent on this point, and in Germany when there is bone TB. the whole carcass is placed in the " poor quality " class.

Greatest variation is found in the judging of TB. of the lymph nodes of the trunk: in France the adjacent tissues must be destroyed; Scottish regulations differ according to the character of the lesions, and in Germany sterilization or sale as " poor quality " is enforced. In Holland old tuberculous lymph nodes in dressed carcasses are cut out.

The regulations for meat inspection for TB. should be improved in all countries, and should be based on modern scientific knowledge.—Jac. Jansen (Utrecht).

Standfuss, R. (1938). Bedeutung und Bewertung des unspezifischen Keimgehaltes bei der bakteriologischen Fleischbeschau. [**Importance of Non-specific Bacteria in Bacteriological Meat Inspection**].—*Tierärztl. Rdsch.* **44.** 581-585. 1 fig., 2 tables. [4 refs.]

A general review of the subject.—V. Chládek (Prague).

THERAPEUTICS

Steck, W. (1938). Zum Problem der Chemotherapie baktiereller Tierkrankheiten. [**The Chemotherapy of Bacterial Diseases**].—*Schweiz. Arch. Tierheilk.* **80.** 329-341. 6 tables. [Numerous refs.]

After an introduction on the present outlook on chemotherapy in animal diseases, S. deals with the acridine group and the *p*-aminosulphonamide group, and with the problem of the mode of action of these drugs.

The acridine group includes trypaflavine, rivanol, uberasan, and entozon, all acting similarly on micro-organisms in the tissues. Their action is inhibited in media containing protein. S. found that trypaflavine is the most effective of the four against mastitis streptococci. The relative streptocidal action of entozon, rivanol and trypaflavine is in the proportion of 1:2:20 and their inhibitory effect on milk secretion 1:2:4. These preparations are too irritant to be administered intravenously. The maximum safe doses of trypaflavine are as follows :– horse 0·5 g. per 100 kg. ; ox 1-2 g. per 100 kg. ; calf 0·25 g. per 100 kg. ; sheep 0·01 g. per kg, and dog 0·02 g. per kg. Acridine therapy is not advised in cases where it is essential to prevent tissue irritation.

In drugs of the *p*-aminosulphonamide group S. found that prontosil (streptozon) was fairly effective by cisternal injection against mastitis, but irritating. Soluseptazine was found to be useless against mastitis, given either intravenously or as an udder infusion.

Three ways of action are discussed :– direct lethal action against the parasitic bacteria, inhibitory action on them and supporting action for the body defences. The author's researches *in vitro* and *in vivo* indicate that the acridine compounds act directly on bacteria and that trypaflavine kills mastitis streptococci in milk in a concentration of 1:20,000 in 6-8 hours. *In vivo* about 75% of infected udder quarters can be sterilized by a pressure infusion into the udder of a 0·065% solution which is equivalent to a final concentration of 1:20,000. Sulphanilamide in high dilutions (10^{-5}) was found to inhibit the growth of mastitis streptococci in milk, but was less effective than trypaflavine when both drugs were tested in lower dilutions.

Arsenic trioxide was found to behave like sulphanilamide. This latter observation may explain the beneficient effects of treating bronchitis in horses with arsenic ; it is supposed that there is some oligodynamic action.—J. E.

Levaditi, C. (1938). Réflexions sur le passé, le présent et l'avenir de la chimiothérapie des maladies microbiennes. [**Past, Present and Future of the Chemotherapy of Infectious Diseases**].—*Pr. méd.* **46.** 572-575. [Numerous refs.]

The development of chemotherapy with prontosil, sulphanilamide and related substances is reviewed, and the various substances synthesized and the diseases treated are discussed. It is emphasized that toxic symptoms are more frequent with sulphanilamide than with the more complex compounds prontosil and rubiazol. Levaditi and Vaisman [*V. B.* **9.** 2.] claim that these substances have an action not only against the organisms, but also against their endotoxins (*Gonococcus*, *Meningococcus*, *Salmonella typhi-murium*). The value of the use of mucin (which greatly increases the virulence of gonococci and meningococci in mice) in the testing of chemotherapeutic substances is emphasized. He stresses the fact that the doses necessary to produce a therapeutic effect are very little below the toxic level, but believes that non-toxic substances will ultimately be produced.—J. M. R.

Veenbaas, A. H., & Sjollema, P. (1939). Streptomycosis. In het bijzonder de bestrijding langs chemotherapeutischen weg. [**Chemotherapy of Streptococcal Mastitis**].—*Tijdschr. Diergeneesk.* **66.** 70-85. [14 refs.] [English, French and German summaries].

After a general discussion on streptococcal mastitis and its control, the authors report experiments on its chemotherapy with sulphanilamide, prontosil soluble and " orgasepton ", a Dutch sulphonamide compound. These drugs were given to affected cows but no great success was obtained. Trials with udder infusions using entozon, trypaflavine and " orgasepton " were then carried out. Results with trypaflavine were unfavourable because it was too irritant, even in a dilution of 1:2,000. Entozon (1:1,000) was less irritant and was effective in some cows towards the end of lactation ; 1% " orgasepton ", however, was non-irritant, but at the same time it was not very effective.—Jac. Jansen (Utrecht).

I. Browning, C. H. (1939). **The Present Position of Chemotherapy by Drugs of the Sulphanilamide Group. The Bacteriological and Experimental Aspect.**—*Brit. med. J.* Aug. 5th. 265-269. [Numerous refs.]

II. Buttle, G. A. H. (1939). **Pharmacology of the Sulphanilamide Group of Drugs.**—*Ibid.* 269-273. 4 diagrams. [Numerous refs.]

I & II. The drugs in general use for chemotherapy are sulphanilamide and certain of its derivatives, which can be divided into those in which substituents are introduced into the amino group and those in which they are introduced into the amide group. Monoacetyl p-p diamino-diphenyl sulphone has been found the most effective against streptococcal and type I pneumococcal infections in mice. M & B 693, rodilone and the monoacetyl compound were found the most effective against staphylococci. The value of the drugs in various experimental infections is reviewed. A necessary condition for therapeutic action is that the organisms and the drug (or perhaps the active derivative of the latter) shall actually meet in the body of the host, and it would appear that while it is under the influence of the drug the body behaves towards particular highly virulent organisms much as the normal body does to those of non-pathogenic type, which are gradually destroyed. Sulphanilamide is absorbed and excreted very rapidly while M & B 693 is absorbed and excreted more slowly, and reaches the cerebro-spinal fluid more slowly than sulphanilamide. The toxic effect produced by the drugs is reviewed.
—J. M. Robson.

I. Schütze, H. (1939). **Chemotherapy in Plague Infection.**—*Lancet.* **236.** 266-268. 5 tables. [3 refs.]

II. Durand, P. (1939). Action du 693 M.B. dans l'infection pesteuse. [**M. & B. 693 in the Treatment of Plague in Mice**].—*Bull. Soc. Path. exot.* **32.** 267-271. 1 table. [1 ref.]

III. Durand, P. (1939). Action de dagénan dans l'infection pesteuse. [**Dagenan (M. & B. 693) in the Treatment of Plague**].—*Arch. Inst. Pasteur Tunis.* **28.** 96-106. 2 tables. [3 refs.]

IV. Girard, G., & Girard, M. (1939). Remarquable efficacité du corps " 693 " M.B. *p. aminobenzène sulfamido-pyridine* dans le traitement de la peste expérimentale. [**Efficiency of M & B 693 (p-aminobenzene sulphamido-pyridine) in the Treatment of Experimental Pasteurella Infection**].—*Bull. Soc. Path. exot.* **32.** 480-482.

I. The drug was given to mice in their food (8-40 g. in 3 kg. of food). The larger doses protected against 10,000 lethal doses of plague bacilli. The bacilli were killed by the drug, as none were found in the bodies of the surviving mice.

Some immunity was produced in the mice which survived the administration of the plague bacilli.

II. The drug protected against infection with plague bacilli in mice and g. pigs. Infected g. pigs survived even though treatment was started 27-48 hours after a severe infection. The data are very few.

III. The drugs were given with the food or by subcutaneous injection: M & B 693 protected both rats and mice against infection with *Pasteurella pestis*; soluseptasine protected rats but not mice, and a diaminodiphenylsulphone glucoside protected mice but not rats. Anti-plague serum injected subcutaneously at the same time as the test dose of *P. pestis* produced results comparable with those of M & B 693.

IV. The drug was administered mixed with the food so that the mice took about 1·5-2·5 mg. per day. This protected against some 10,000 lethal doses of plague bacilli. No bacilli were as a rule recovered in those animals which died in spite of treatment with M & B 693. Most of the surviving animals had acquired some immunity against plague.—J. M. Robson.

I. Debono, J. E. (1939). **Treatment of Brucella melitensis Infection with Prontosil.**—*Brit. med. J.* Feb. 18th. 326-327.

II. Anon. (1939). **Chemotherapy in Undulant Fever.**—*Ibid.* 342.

III. Thomson, A. P. (1938). **Treatment of Brucella Abortus Infection with Fouadin and Prontosil.**—*Ibid.* Oct. 29th. 884-885.

IV. Menefee, E. E., Jr., & Poston, Mary A. (1939). **Effects of Sulfanilamide on Brucella melitensis, var. melitensis, abortus and suis.**—*J. Bact.* **37.** 269-276. 1 fig., 5 tables. [12 refs.]

I & II. Twenty-five cases of undulant fever due to *Br.m.* infection were treated with prontosil for seven days. In no case could recovery be attributed unequivocally to this treatment. The difficulty of assessing therapeutic effects in such cases is emphasized. The work of Wilson and Maier [*V.B.* **9.** 652.] shows that sulphanilamide has a distinct effect on experimental infection with *Br. abortus*, and it is suggested that further trial of this drug in cases of undulant fever is necessary.

III. Two cases appear to have benefited from treatment with " fouadin ". Three cases were treated with prontosil, and in all of them improvement was rapid, and in the most severe one was dramatic. In two cases the specific agglutination declined to negligible titres after prontosil treatment; this was not observed in a case treated with " fouadin ".

IV. Sulphanilamide and a number of related compounds exert a bacteriostatic action on the brucella organisms, observed only at periods longer than 36 hours after incubation. The bacteriostatic effect is less when sulphanilamide is combined with specific immune serum. Experiments on g. pigs support the clinical observations in suggesting that the bacteriostatic action allows the normal defence mechanisms of the body to cope adequately with the invading bacteria.—J. M. Robson.

Schern, K. (1937). Die Privation, ein neuer Weg zur Chemotherapie und Chemoprophylaxe, erstmalig angewandt gegen die experimentelle Trypanosomen- und Treponemeninfektion. **[Sugar Privation Treatment of Trypanosomiasis].**—*Tierärztl. Rdsch.* **43.** 675-678.

S. found that fresh blood and liver of healthy animals contains an alcohol-soluble substance which is stated to favour the life of trypanosomes in the host. The blood sugar curve and the temperature curve of infected animals are related

in such a way as to suggest that the presence of sugar and glycogen have an influence on the course of infection. [See *V. B.* **8.** 502]. S. suggests that a state of glycoprivia reacts unfavourably on parasitic trypanosomes without harming the general health of the host.

He describes experiments with two proprietary remedies which are said to intensify amylase action and to be used for the treatment of human diabetes ; they were administered *per os* to rats infected with pathogenic trypanosomes [no details] and are stated to have had curative and preventive effects.—V. Chládek (Prague).

Anon. (1939). **Adrenaline in Malaria.**—*Lancet.* **237.** 942-943. [6 refs.]

This annotation discusses reports on the successful treatment of human malaria by repeated daily doses of adrenalin intravenously (in addition to specific chemotherapy). The results recorded are very good and are thought to be due to the contraction of the spleen and the consequent evacuation therefrom of malaria parasites, which can be attacked by quinine in the circulating blood. [This type of therapy may be worth a trial in protozoan diseases of animals].—J. E.

Robin, V., & Charton, A. (1938). Le traitement de la gastro-entérite infectieuse du chat par les phénylamines sulfamidées. [**Treatment of Infectious Gastro-enteritis in Cats with Phenylamine Sulphamides**].—*Rec. Méd. vét.* **114.** 453-458. 2 figs.

The recovery rate in cats suffering from infectious gastro-enteritis and treated with septasine or soluseptasine was over 95% of 38 cases. The animals received twice daily injections of 5 c.c. of a 6% solution of soluseptasine or 2 g. of septasine by mouth every day. In serious cases the dose may be doubled without producing any toxic effects. A marked improvement is noted by the third day of the treatment.—J. M. Robson.

Demianovich, M. P. (1937). Novoe v lechenii chesotki selskokhoziaĭstoennykh zhivotnykh. [**Treatment of Mange in Domestic Animals**]. pp. 32. 13 figs., 1 photograph. Moscow : Seljhozgiz. [8vo] [In Russian].

This is substantially the same as a paper abstracted previously [*V. B.* **8.** 250.].

Whitney, L. F. (1939). **Hydrogen Peroxide as a General Anthelmintic for Dogs.**—*Vet. Med.* **34.** 560-566. 2 tables. [4 refs.]

Thirty dogs proved by faecal examination to be infected with tapeworms, whipworms, roundworms and ascarids, were given hydrogen peroxide *per rectum.* The dogs were previously fasted and not constipated. Solutions varying in strength from 1·5-6% were used, and the injection was continued until emesis occurred. Large numbers of parasites were voided in the vomit and later in the faeces. The treated animals were autopsied at intervals ranging from 30 mins. to 48 hours after treatment and the number of parasites present in the alimentary canal counted. In many cases no parasites were left and in no cases had tapeworms remained. No evidence of any damage to the gastric or intestinal mucosae could be observed, and with the exception of a slight discomfort to the dog during injection no after effects were noticed. Two dogs were treated three times each at intervals of a week without ill effect. The 1·5% solution was found to be as effective as the 6% solution.

Twenty-two other dogs, including valuable animals, were also treated by this method, and faecal examination after treatment showed the presence of parasites in only five of the dogs.—F. T. Boyle.

PETERSEN, P. J. (1939). Nogle Forsøg med Behandling af Sterilitet med Physex " Leo ". [**Treatment of Sterility in Cows with " Physex Leo " Gonadotropic Hormone**].—*Medlembl. danske Dyrlaegeforen.* **22.** 15-20. 3 tables.

P. states that the results of his own trials in 1936, as well as those communicated to him by two colleagues during the same year, lead him to believe that " physex leo ", a gonadotropic hormone of proprietary origin, at a dose of 200 mouse units per injection, is a useful means for the treatment of sterility in cows due to defective functioning of the ovaries. This is especially so in cases which are not amenable to manual treatment because of the absence of *corpora lutea.*

JEMILLER, U. (1938). Heilversuche beim Zungenschlagen der Rinder. [**Treatment of " Tongue Shaking " in Cattle**].—*Berl. tierärztl. Wschr.* June 24th. 369-370.

A discussion of the use of a proprietary remedy of undisclosed composition. The results obtained were not very good. [The nature of the condition referred to as " Zungenschlagen " is not clear].—A. T. PHILLIPSON.

POISONS AND POISONING

JANSCH, H., & BRACHETKA, J. (1939). Zur Frage der Todesfälle bei mit Atoxyl behandelten Hühnern. [**Deaths Among Poultry Treated with Atoxyl**].—*Wien. tierärztl. Mschr.* **26.** 289-293. 1 table. [4 refs.]

The authors state that accurate quantitative determinations showed that the internal organs and muscles of a hen affected with visceral and articular gout, which had died 39 hours after treatment with atoxyl, contained roughly six times as much arsenic as those of another bird, free from gout, which had likewise succumbed after atoxyl treatment, and as those of healthy birds which were killed after receiving atoxyl injections ; about twice as much arsenic as in the latter was found in the organs and muscles of another normal bird similarly treated with atoxyl, but of which one of the ureters had been ligatured. These findings, together with the fact that lesions symptomatic of arsenical poisoning have never been recorded in gouty poultry which died after atoxyl treatment, lead the authors to suggest that the lethal action of atoxyl in birds suffering from gout is due to the considerable slowing down of the elimination of arsenic from their body through the kidneys.

MOXON, A. L. (1937). **Alkali Disease or Selenium Poisoning.**—*Bull. S. Dak. agric. Exp. Sta.* No. 311. pp. 91. 22 figs., 3 tables, 5 charts, 4 maps. [Numerous refs.]

This publication brings the whole question of selenium poisoning of livestock up to date. The chronic type of poisoning predominates in South Dakota where it goes by the old misnomer " alkali disease ". The acute type is commonly known in Wyoming as " blind staggers ". Other states probably affected are North Dakota, Nebraska, Kansas, Oklahoma, Texas, New Mexico, Arizona, Utah, Colorado, and Montana. This widespread prevalence of Se in the Great Plains and Rocky Mountains areas intensifies the seriousness of the problem from an agricultural point of view.

The general symptoms of Se poisoning are dullness, emaciation and rough coat, atrophy of the heart, cirrhosis of the liver, anaemia, erosion of the long bones, especially of the joints, loss of hair, particularly from the mane and tail of horses and switch of cattle, and soreness and sloughing of the hoofs.

In poultry the disease is also manifested by low hatchability of the eggs and high incidence of monstrosities in chicks. Results of experimental poisoning of rats and dogs are described. A statistical study of toxicity in relation to Se content showed that as little as 5 p.p.m. in the diet prevented normal growth. In grains the toxic factor is associated with the protein fraction.

The Se content of vegetation grown on seleniferous soils depends upon several factors. Absorption of Se from soil is probably greater in wet than in dry seasons. Certain species of plants, *e.g. Astragalus*, *Aster*, *Stanleya*, and *Oonopsis*, can absorb Se from the soil in forms less available to crops and grasses and are termed "connecter plants", since on decay they leave the Se in a form readily absorbed by other plants.—H. H. Green.

Nichols, M. S. (1939). **Occurrence, Pathological Aspects, and Treatment of Fluoride Waters.**—*Amer. J. publ. Hlth.* **29.** 991-998. 2 figs., 2 tables, 1 diagram. [Numerous refs.]

The association of imperfect enamel structure in the teeth of children with F in the drinking water has created a world problem on how to render such water innocuous. In America, the origin of the F appears to be in igneous rocks underlying sedimentary foundations, but various F minerals, such as fluorspar and fluorapatite, may be present in the sedimentary rocks, affecting the drinking water drawn from such formations. There is no evidence that F is indispensable in the nutrition of animals, but toxic effects may readily follow upon moderate increase in the F intake.

Treatment of F water has been attempted (1) by chemical removal of F, (2) by sinking other wells in a different locality or stratum and (3) by the development and purification of surface waters, low in F. Description is given of the principles underlying chemical removal of F by lime, alumina, calcium phosphate, magnesia and by ordinary methods of water softening.—Alfred Eden.

Finnemore, H., & Cooper, Joyce M. (1938). **The Hydrocyanic Acid Content of Samples of *Lotus australis* and *Heterodendron oleaefolium*.**—*Aust. vet. J.* **14.** 153-157. 6 tables. [2 refs.]

Lotus australis var. *pubescens* (N.O. Leguminosae), a perennial cyanogenetic plant found in western New South Wales, was responsible for deaths among sheep during 1937. The HCN content of seven samples varied from 0·22-1·0% (calculated on a dry weight basis). The plant loses a considerable amount of HCN when dried, but retains sufficient to remain toxic.

Heterodendron olaefolium or "Rosewood" (N.O. Sapindaceae) is a particularly common tree in central and north-west New South Wales, being frequently used as a drought fodder for sheep, among which it sometimes causes mortality. Some figures for 1931-32 are quoted. The HCN yield of 32 samples is recorded. This varied from 0·005-0·068% without, and from 0·009-0·321% with, added enzyme (almonds) [most probably emulsin].—H. B. Carter.

Turbet, C. R. (1938). **Poisoning of Dogs by the Giant Toad, *Bufo marinus*: Its Treatment with Nembutal.**—*Aust. vet. J.* **14.** 152-153.

Several cases of poisoning among domestic dogs which have seized in their jaws the heads of the introduced Giant Toad (*Bufo marinus*) have been noted in Fiji. Details of symptoms and treatment in the case of a 4-months-old fox-terrier pup are given. Immediate intravenous injection of nembutal was successful in this and other cases.—H. B. Carter.

PHYSIOLOGY

Weiss, M. (1939). O djelovanju vanjske temperature na temperaturu tijela i kolicinu krvnog šecera kod goveda. **[Influence of Atmospheric Temperature on the Body Temperature and Blood Sugar of Cattle]**.—*Vet. Arhiv.* **9.** 347-352. 1 table. [11 refs.] [German summary].

A series of investigations was carried out on nine cattle, to ascertain the relation of body temperature to changes in the atmospheric temperature. When the atmospheric temperature fell 10°C., there was a slight increase in body temperature, up to 0·3°C., in some animals, a decrease of not more than 0·4°C. in others, while there was no change in the remainder.

In all animals, however, an increase in content of about 0·006% could be observed in the blood sugar when the atmospheric temperature fell 10°C., due probably to a higher metabolism rate.—B. Oswald (Križevci).

Marek, J., Wellmann, O., & Urbányi, L. (1938). A malacvér összetételének változása különböző ásványi anyagtartalmú takarmány hatására. **[Influence of the Mineral Composition of the Diet on the Mineral Content of the Blood in Pigs]**.—*Állatorv. Lapok.* **61.** 435-438. 1 fig., 4 tables. [German version appeared in *Hoppe-Seyl. Z.* (1939). **257.** 246-254.]

Eight piglets eight weeks old, from the same litter, were divided into four groups of two and fed on a uniform basic diet with the addition of varying proportions of Ca, Mg and P.

After 8 weeks, examination of the blood showed that, although the mineral content of the serum was influenced by the mineral intake, changes in the mineral content were by no means coincident with changes in the intake. Thus, although piglets in group 4 received less than one tenth of the Ca fed to those in group 2, their serum Ca was almost the same. The authors regard this as confirmation of the view that the Ca content of the blood is regulated by some endocrine agency. Further, the fact that the Ca content of the serum showed greater variations when the Ca intake was high, permits the conclusion that the regulating effect is stricter when the Ca supply is scanty than when it is abundant, the specific action of the parathyroid being directed pre-eminently towards maintaining a certain minimum Ca level, beyond which endocrine regulation is less pronounced and the influence of external dietary factors more in evidence. Once the Ca supply is above the required minimum, the Ca content of the serum is apparently regulated by the Ca and P intake, the two factors acting antagonistically to each other. Increased Ca intake raises, while increased P intake lowers the Ca level of the serum. On the other hand animals fed on a diet containing identical quantities of P showed a P content in the serum inversely proportionate to the Ca intake. The wide fluctuation of the P content is interpreted as evidence that the influence of internal factors on the inorganic P content of the blood is less than that of the mineral composition of the diet.

The authors consider that these results are significant for the diagnosis of causes of disturbances in mineral metabolism and that the value of the Ca/P quotient of the blood serum permits conclusions to be drawn regarding the mineral composition of the diet.

I. Sutlić, A. (1939). Sadržaj karbamida u krvi zdravih goveda. **[Urea Content of the Blood of Healthy Cattle]**.—*Vet. Arhiv.* **9.** 11-13. [2 refs.] [German summary].

II. Sutlić, A. (1939). Prinos poznavanju normalne i poremecene funkcije

bubrega kod konja. [**Tests of the Function of Normal and Diseased Kidneys in Horses**].—*Ibid.* 41-65. [12 refs.] [German summary].

I. Samples of blood, obtained from 200 healthy cattle, aged from 18 months to 15 years, were examined for their urea content by the Hüfner-Ambard-Hallion method, and by means of Kowarski's urometer. The results obtained varied from 3·928 mg.% to 47·664 mg.%, the average being 15·78433%. It is suggested that a high level of blood urea is a feature of well-nourished animals.

II. Blood samples, obtained from 200 healthy horses of various ages, were examined for both urea content and indican content. The urea content was tested by the same methods as in I. The results obtained varied from 11·368 mg.% to 56·762 mg.%, the average being 35·72 mg.%. The indican content was examined by means of a modified Jolles-Rosenberg's method, and the results varied from 0·08 mg.% to 0·213 mg.%.

Samples of blood obtained from six horses with diseased kidneys were also tested. In a case of chronic diffuse glomerulo-nephritis the highest urea content was found to be 343·7 mg.%. In a case of cystic degeneration of the kidneys an indican content as high as 3·2 mg.% was recorded.

Retention, however, of both urea and indican in the blood was also observed in cases other than affections of the kidney, such as gastro-enteritis, pneumonia, infectious anaemia, constipation, and rhinitis.—B. Oswald (Križevci).

Kovács, A. (1936). Egyes háziállataink bőrének és szőrének cystintartalma. [**Cystine Content of the Skin and Hair of Some Domestic Animals**].—*Thesis*, *Budapest*. pp. 8. 1 table. [German summary].

K. found the average cystine content of the skin to be 0·73% in horses, 0·71% in cattle, 0·76% in pigs and 0·61% in dogs, the relative figures for hair being 7·58%, 5·17%, 3·52% and 9·03%.

The skin showed variations in cystine content up to 10% and the hair up to 35% in materials taken from different parts of the body, the figures being lowest for the inguinal region and highest for the coccygeal area.

The cystine content of skin and hair from the same regions of different individuals of the same species was found to vary very slightly.

Szabó, J. (1937). A szarvasmarha és lo vizeletének fenoltartalma. [**Phenol-Content of the Urine of Cattle and Horses**].—*Thesis*, *Budapest*. pp. 12. 2 tables. [Numerous refs.] [German summary].

Thirty-two cattle and 17 horses were examined. The author found that the urine of normal cattle contained 700-1,200 mg. phenol per litre. Little difference was found to exist between the urine of bulls, bullocks and cows in this respect, but the urine of a cow in the final stages of pregnancy showed a considerably increased phenol content.

The urine of horses was found to contain 330-990 mg. per litre. Individual variations are ascribed by the author to differences in the diet. Increased phenol values were found in cases of intestinal obstruction, constipation and in the presence of septic processes.

Kókai, M. (1936). Az egyes háziállatok vizeletének és gyomor-béltartalmának indikántartalma. [**Amount of Indican in the Urine and Stomach and Intestinal Contents of Domestic Animals**].—*Thesis*, *Budapest*. pp. 8. 2 tables. [16 refs.] [German summary].

K. determined the quantity of indican in the urine of horses, cattle, calves, sheep, pigs and dogs and in the gastro-intestinal contents of horses, cattle and

rabbits. He found that the urine of the horse contained on an average 311 mg. indican per litre, but the values were subject to considerable fluctuations. The respective figures for adult cattle, calves, sheep, pigs and dogs were 295 mg., 69 mg., 71 mg., 79 mg. and 69 mg. No quantitative data are given for the gastro-intestinal contents, but it is stated that the amount of indican varied in the different sections of the gastro-intestinal tract, the smallest quantities being found in the stomach and the largest in the colon.

MAGYAR, M. (1937). A házimadarak veséjének és húgyutainak összehasonlító szövettani szerkezete. [**Histological Structure of the Kidneys and Urinary Passages of Poultry**].—*Thesis, Budapest.* pp. 14. 6 figs. on 1 plate, 2 tables. [13 refs.] [German summary].

A detailed description of the microscopic structure of the kidneys and urinary passages of domestic fowls based on the examination of 6 hens, 4 turkeys, 4 geese, 3 ducks and 2 pigeons.

FLOREY, H. W., JENNINGS, M. A., JENNINGS, D. A., & O'CONNOR, R. C. (1939). **The Reactions of the Intestine of the Pig to Gastric Juice.**—*J. Path. Bact.* **49.** 105-123. 11 text figs., 11 figs. on 2 plates. [Numerous refs.]

Young pigs weighing 10-15 kg. were subjected to a variety of entero-surgical interferences, including the Mann-Williamson operation and duodenal and ileal fistulae of varying types; in all, experiments upon 32 animals are described. Those parts of the small intestine which do not contain Brunner's glands were found to ulcerate rapidly on exposure to undiluted gastric juice, but the duodenum and the first part of the jejunum, which in this species is said always to contain Brunner's glands, were very much more resistant and did not actually ulcerate.

The paper contains an account of the histological findings and an interesting section on endoscopical examinations, for which a specially designed open-ended instrument, similar to the Harrison urethroscope, was employed.—A. N. WORDEN.

VAN DER KAAY, F. C. (1938). Der Einfluss von gonadotropen Hormonen auf die Ovarien von Hund, Rind und Schwein. [**Influence of Gonadotropic Hormones on the Ovaries of Dogs, Cattle and Pigs**].—*Rep. 13th int. vet. Congr. 1938.* **2.** 1355-1367. [In German: English, French and Italian summaries. Discussion p. 1368 in English and German].

Experiments with gonadotropic hormone from human pregnancy urine were carried out on bitches, cows and sows. One ovary was removed before treatment and the other after treatment. The ovaries were examined both macro- and microscopically.

In order to induce signs of oestrus in anoestrous bitches at least 1,000 Rat Units of hormone were required. The hormone was given subcutaneously in doses of 1,000 R.U. and up to 26,000 R.U. were used in certain cases. In general, the chief change in the ovary was enlargement of the follicles, which after large doses showed signs of atresia. Ovulation was never observed. The ovary was hyperaemic and sometimes haemorrhagic. After the injection of small doses, development of the theca interna and granulosa was noted; large doses induced the development of corpora lutea, particularly in sows. The hormone produced no changes in the ovaries of very young bitches or pigs, nor in the ovaries of a pregnant bitch, which did not abort. Signs of heat always appeared in those animals which reacted to the hormone, and it is concluded that it speeds up the sexual cycle but that the ovary returns to its previous condition very quickly.

No difference was noted between the action of pregnyl and prolan. It is

pointed out in the discussion that prolan in oil induces the formation of corpora lutea and has been successfully used for the treatment of cystic ovaries in cattle, nymphomania in mares and the prevention of oestrus in bitches. Small doses of prolan—30 to 100 M.U.—improve the fertility rate of silver-foxes.—J. A. N.

TECHNIQUE AND APPARATUS

JAMIESON, S. R. (1938). **A Simple Medium for the Cultivation of the Tubercle Bacillus.**—*J. Path. Bact.* **47.** 353-355. 2 tables. [9 refs.]

Minced horse flesh (1 lb.) and tap water (800 c.c.) are heated together to 80°C.; 6·4 g. anhydrous sodium carbonate in 800 c.c. tap water are added and the mixture is cooled to 45°C. After adding sodium citrate (3 g.), glucose (2 g.), chloroform (18 c.c.) and liquor trypsini co. (18 c.c.), the mixture is incubated at 37°C. for six hours. Strong hydrochloric acid (13 c.c.) is added; the mixture is steamed for 20 minutes and filtered. The medium is bottled and sterilized for one hour after adjusting the reaction to pH 7·6. Agar (2%) is incorporated and two egg yolks are added to 300 c.c. of the broth cooled to 55-60°C.

Earlier and more luxuriant growth was obtained on this medium. Microscopically negative sputa gave cultures on this medium while negative results were recorded on some of the other media examined.—E. C. HULSE.

NICOLAU, S. (1939). Méthode très simple pour la coloration de certains corpuscules élémentaires (inframicrobes, agents étiologiques de maladies à ultravirus): psittacose, vaccine, rage, herpes, maladie d'Aujeszky, peste aviaire. [**Simple Method for Staining Elementary Bodies of Psittacosis, Vaccinia, Rabies, Herpes, Aujeszky's Disease and Fowl Plague**].—*C. R. Soc. Biol. Paris.* **130.** 993-996. [14 refs.]

Elementary bodies of different viruses, obtained from suspensions of virulent material by fractional centrifugation at high speed, were stained in a hot solution of carbol isamine blue (isamine blue, Grübler, 1 g.; phenol 3 g.; ethyl alcohol 10 c.c., and water 100 c.c.). The stain is excellent for this purpose because it colours the bodies intensely without producing non-specific precipitates.—R. E. G.

CRAIG, R., & SPURLOCK, G. M. (1939). **Buffered Solutions in Staining Helminths.**—*Proc. helminth. Soc. Wash.* **6.** 104-105.

The authors studied the pH range for the most selective staining of various helminths with haematoxylin made up in 80% alcohol as recommended by CRAIG and WILSON [(1937). *Stain Tech.* **12.** 99-109.], Bouin's fluid being used for some and PETRUNKEVITCH's fixative for others. The best pH for cestodes and trematodes was in the region of 1·2 while for nematodes it lay between 1·2 and 1·15.—A. L. W.

HUGHES, T. P., PICKLES, E. G., & HORSFALL, F. L., Jr. (1938). **A Method for Determining the Differential Sedimentation of Proteins in the High Speed Concentration Centrifuge.**—*J. exp. Med.* **67.** 941-952. 2 figs., 6 tables. [12 refs.]

By means of a high speed vacuum centrifuge, studies were made on the sedimentation of small particles of various proteins. After being centrifuged for three hours at 27,300 r.p.m., samples from each centrifuge tube at various heights were removed by an ingenious apparatus for analysis without stirring up the contents, six different samples of equal depth being secured. Various substances, including horse serum albumen, oxyhaemoglobin, ovalbumen, haemocyanin,

yellow fever virus and serum protein were examined by chemical or biological assay, and the degree of sedimentation, expressed as S.F., was found to be reproducible to within 10% and, under the conditions specified, was found to be characteristic for the proteins so far investigated.

[S.F. is calculated as the summation, irrespective of the sign + or —, over the six analyses, of 16·66 ($\frac{100}{6}$) minus the concentration, expressed as a percentage, of the total constituent under examination contained in each portion analysed. Thus in a homogeneous solution, no sedimentation occurs and S.F. = 0; with complete precipitation all the constituent is found in the sixth and bottom sample and S.F. = 167. The range of S.F. values is thus 0 to 167].—Alfred Eden.

MISCELLANEOUS

I. —. (1939). Sondernummer anlässlich des Initiativbegehrens in Basel für ein Gesetz gegen die Vivisektion. [**Special Issue on the Occasion of the Motion for a Referendum to Introduce a Law against Vivisection**].—*Schweiz. med. Wschr.* **69.** 889-920.

II. von Muralt, A. (1939). Grundsätzliches zum Initiativbegehren für ein Gesetz gegen die Vivisektion. [**Fundamental Considerations Regarding the Move for a Law against Vivisection**].—*Ibid.* 889-892.

III. Hess, W. R. (1939). Eine Stellungnahme der Schweizerischen Medizinisch-Biologischen Gesellschaft zum Tierversuch. [**The Attitude of the Swiss Medico-Biological Association to Animal Experiments**].—*Ibid.* 892.

IV. Burnet, E. (1939). La vivisection et les recherches pastoriennes. [**Vivisection and Pasteurian Research**].—*Ibid.* 892-894. [In French].

V. Dujarric de la Rivière, R. (1939). Nécessité de l'expérimentation sur les animaux. [**The Necessity of Animal Experiments**].—*Ibid.* 894-895. [In French].

VI. Uhlenhuth, P. (1939). Die experimentelle Forschung im Dienste der Seuchenbekämpfung unter Berücksichtigung eigener Forschungsergebnisse. [**Experimental Research in the Service of the Control of Epidemics**].—*Ibid.* 895-901.

VII. Mooser, H. (1939). Ueber die Bedeutung des Tierversuchs für die Epidemiologie und die Seuchenbekämpfung. [**The Importance of Animal Experiments in Epidemiology and the Control of Epidemics**].—*Ibid.* 901-903.

VIII. Roch, M. (1939). Clique médicale et expérimentation sur l'animal. [**Clinical Medicine and Animal Experiment**].—*Ibid.* 903-905. [4 refs.] [In French].

IX. Staehelin, R. (1939). Die Bedeutung des Tierversuches für die innere Medizin. [**The Significance of Animal Experiments for Internal Medicine**].—*Ibid.* 905-908.

X. Fischer, H. (1939). Selbstversuch und Tierversuch. [**Auto-Experiment and Animal Experiment**].—*Ibid.* 908-911.

XI. Frei, W. (1939). Die Bedeutung des Tierversuches für die Veterinärmedizin. [**The Importance of Animal Experiments in Veterinary Medicine**].—*Ibid.* 911-913.

I. Statement of the editorial board of the journal on the object of this special issue, which is to provide the practising physician with the necessary arguments to oppose the gross ignorance and fanaticism of the anti-vivisectionists, who are

attempting to obtain legislation to prohibit all animal experiments and tests in the canton of Basel. Abstracts of individual articles will be found below.

II. In defending the practice of vivisection in Switzerland, the author mentions the 1934 convention adopted at a joint meeting of delegates of the German-Swiss Society for the Prevention of Cruelty to Animals and of the Swiss Medico-Biological Society; he states that the rules for animal experiment laid down in that convention are being scrupulously observed and claims that in this respect Swiss conditions are the admiration of the world.

Discussing the draft itself he observes that in enumerating the operations to be prohibited, the authors of the draft have included certain provisions which, if adopted, would altogether paralyse scientific work in the territory to which the law would apply.

The result would be the emigration from the canton of Basle of valuable industrial plants producing hormonal and other remedies and the loss by the Universities of their scientific reputation.

III. This is a description of the arrangement [mentioned in II] between the Swiss Medico-Biological Society and the Swiss Society for the Prevention of Cruelty to Animals giving a detailed ruling on the manner in which animal experiments may be conducted.

IV. In this paper B. gives a short survey of the vital discoveries of physiology and immunology which would have been impossible without animal experiments and speaks of the absurdity of attempting to prohibit animal experiments for scientific purposes in a world which maintains slaughterhouses for food.

V. Quoting Claude Bernard, who said that it would be strange indeed if man were to be permitted to use animals for every purpose except that of advancing one of the sciences of the greatest benefit to man, the author points out that prohibition of animal experiment would certainly result in the impossibility of curing or relieving the suffering of animals as well as human beings.

VI. U. points out that the causative agents of anthrax, tuberculosis, cholera, typhoid, diphtheria, glanders, erysipelas, dysentery, tetanus, plague and others would never have been discovered without animal experiment. Our knowledge of deficiency diseases is also to a great extent a result of animal experiments, and the early diagnosis of anthrax and tuberculosis would be impossible without them.

Modern virus research is unthinkable without animal experiments, and proof of their value is the fact that diseases which cannot be transmitted to animals are for the greater part still unelucidated (*e.g.* measles, scarlet fever). Preventive and curative sera and vaccines can only be produced and their harmlessness and effectivity controlled by animal experiments. Smallpox, once a dread disease which devastated whole countries, has now almost disappeared from civilized countries as a result of animal experiment.

In addition to biological remedies which cannot be produced except by the use of animals, chemical remedies must also be tried out on animals before they can be used for human beings or animals. There can therefore be no chemotherapeutical progress without animal experiment. The recent tremendous advance in chemotherapy with the sulphanilamide group owes its development to animal experiment. Cancer research also depends to a considerable extent upon this method of work.

Possible abuses could be successfully excluded by suitable legislation, but no right-minded person could renounce the innumerable blessings conferred on sufferers by research based on animal experiment.

VII. Biology being the science of the phenomena of life, biological research is obviously impossible without observation of living organisms. The fulfilment

of KOCH's postulates for the elucidation of the aetiology of contagious diseases presupposes animal experiment. Examples are quoted of recent advances in epidemiology and epizootology as a result of the discovery of susceptible animals and the consequent possibility of animal experiment.

M. concludes with the observation that anti-vivisectionists flourish only where public health has attained very high standards. In countries where serious epidemics are common, the public gladly welcomes every attempt of medical science to cure or prevent them. But where the great scourges have disappeared thanks to the vigilance of the public health authorities, many people forget that this fortunate state of affairs is due mainly to knowledge gained by animal experiments.

VIII. This paper repeats many of the arguments against the anti-vivisectionist proferred by other authors, such as the progress of diagnostic science, and the prevention and cure of infectious diseases. R. then points out the importance of hormone preparations such as adrenalin, thyroidin, insulin, pituitrin and sex hormones, which would be unobtainable without the sacrifice of animals.

IX. Another record of the advance of biology and medicine as a result of experiments in animals.

X. F. quotes many instances in which research workers have risked their lives in auto-experiments undertaken to elucidate some unsolved problem in the interest of humanity, and argues that if human beings have voluntarily subjected themselves to such dangers and suffering for the advancement of science, they have every justification in using animals not only for research but also for prevention and cure of diseases in animals as well as human beings, especially as for decades now every precaution has been taken to eliminate pain from animal experiments.

XI. The author describes the advances made by veterinary biology, pathology, pharmacology, immuniology, *etc.* as a result of animal experiment and points out that active preventive inoculation against rabies, rinderpest, foot and mouth disease, pox, brucellosis, paratyphoid, *etc.* would be impossible without animal experiment. One animal can provide protection for 100-150 of its own species, yet the anti-vivisectionists want to prohibit even this type of animal experiment. Hence their objective is not one of prevention, but of promotion of cruelty to animals and human beings.

VON DARÁNYI, J. (1937). Biologischer Zusammenhang zwischen Virus, Bakteriophage, Gen und Krebserreger. [**Biological Connexion between Virus, Bacteriophage, Genes and Cancer Production**].—*Dtsch. med. Wschr.* **63.** 1266-1267. [Abst. in *Amer. J. Cancer.* **36.** 473, copied *verbatim.* Signed : Seaton SAILER].

This is a general discussion of the ultra-microscopic forms of living structure in relation to the production of carcinomatous growth.

OFFICIAL AND OTHER REPORTS

GREAT BRITAIN. (1938). **Annual Report of the Director of the Moredun Institute, Gilmerton for 1937-38.** [GRIEG, J. R.] pp. 19. Midlothian : Moredun Institute. [8vo].

LOUPING ILL.—Encouraging results were obtained with a hyperimmune serum for use on young lambs.

GRASS SICKNESS.—In a field experiment, 945 horses were vaccinated and

immunized to the bacterial toxin found in a proportion of peracute cases of the disease. This failed to prevent the disease, and so it appears that this bacterial toxin alone is not the cause of the disease.

Scrapie.—Work will be carried out to ascertain whether the infective agent can be isolated and to confirm the suggestion that it can be transmitted *via* the pastures.

White Scour.—Research to determine the preventive value of vitamin A in this disease in calves have yielded encouraging results and are being repeated.

Pine.—Experiments to confirm the suggestion that cobalt deficiency may be responsible in some cases, as it is in Australia and New Zealand, are being arranged.

Lactation Tetany.—A preliminary survey indicates that this disease is fairly common throughout Scotland. In collaboration with the Macaulay Institute of Soil Research, soil and pasture from farms where the disease exists is being analysed.—J. C. Wallace.

Canada. (1938). **Report of the Veterinary Director General for the Year ended March 31, 1938.** [Hilton, G.] pp. 45. Numerous tables. Ottawa: J. O. Patenaude, I.S.O. [8vo].

Continued freedom from foot and mouth disease, dourine, and sheep scab is recorded. Equine encephalomyelitis virus was isolated from field specimens. Vaccine distribution is not permitted unless the product cannot produce disease.

1,409,000 tuberculin tests were conducted. There are now about 823,000 cattle in areas containing 0·5% or less of tuberculous cattle, and 8,000 accredited herds containing about 240,000 cattle. 390,000 cattle are awaiting the initial area test. It is estimated that an infection of 5% in 1928, has been reduced to 3% or less. 457 herds (30% of those receiving official attention) are listed as free from brucella infection. Reactors are ear-tattoed.

Numerous other activities are referred to, including the inspection of 81 plants by the Meat and Canned Foods Division, and examinations and tests (122,057 specimens etc., were received) carried out by the Pathological Division. The report includes detailed statements by the Chief Veterinary Inspector, the Chief of the Meat and Canned Foods Division, and the Chief Animal Pathologist; these have been abstracted separately and appear below.—C. Mackie.

Canada. (1938). **Report of Contagious Diseases Division, 1937-38.** [Cameron, A. E.]—*Rep. vet. Dir. Gen. Dep. Agric. Can. 1937-38.* pp. 10-32. Numerous tables.

Three outbreaks of Anthrax occurred in Quebec Province; 23 animals died and 572 were quarantined. Eight cases of Glanders occurred in Saskatchewan. Two outbreaks of Sarcoptic Mange in cattle and three of Chorioptic Mange were reported. One isolated case of Rabies occurred in Toronto.

During the year reviewed there were no outbreaks of dourine, swine fever, horse mange or sheep scab.

The various plans for the eradication of Tuberculosis are given with details of the progress made. There were 8,172 herds registered as "accredited" at March 1938. During the year over 300,000 tuberculin tests had been carried out and 2,234 reactors slaughtered at a compensation cost of $102,836. There were 46,813 herds enrolled in the "supervised herds plan". In the "restricted areas eradication scheme", 823,882 cattle were tuberculin tested and 10,924 of them were slaughtered at a compensation cost of $323,000.

There are 40,768 cattle under test for Brucellosis in Canada.

The remaining portion of the report is devoted to Extracts of Orders in Council, Ministerial Orders, and tables.—E. F. Pallister.

CANADA. (1938). **Report on Meat and Canned Foods, 1937-38.** [BARNES, R.]—*Rep. vet. Dir. Gen. Dep. Agric. Can. 1937-38.* pp. 33-38. 4 tables.

There was a slight increase in the total number of animals slaughtered, excluding poultry. There was a considerable decrease in the total of poultry killed from the peak year 1936-37, and a notable drop in the total of animals found dead through transit.

During the year, 20,266 cattle carcasses were condemned, *i.e.* 1·25% of the total cattle killed. The principal causes of condemnations were emaciation, immaturity and tuberculosis. Condemnations in sheep carcasses amounted to 0·31% as against 0·35% for the previous year. Swine condemnations totalled 10,258 carcasses, or 0·28% of the total killed.—J. W. PULLIN.

CANADA. (1938). **Report of Division of Animal Pathology, 1937-1938.** [WATSON, E. A.]—*Rep. vet. Dir. Gen. Dep. Agric. Can. 1937-38.* pp. 39-45. 3 tables.

A brief general report is given of the activities of the Animal Diseases Research Institute at Hull (P.Q.) and of the various substations and laboratories, the work being grouped under three principal subdivisions :– (1) animal diseases research and investigation, (2) veterinary biological products, and (3) diagnostic and miscellaneous services.

Research.—Research into various aspects of mastitis and brucellosis in cattle is proceeding, with particular reference to the diagnosis of mastitis and vaccination against brucellosis. An investigation into " skin lesion " reactors to the tuberculin test was completed and results are being published separately. Studies of the value of BCG vaccination were completed ; it is concluded that the " vaccination of calves tends to retard progressive TB. until the animals reach breeding age, but is without effect in the reproductive period of life or when the animals are exposed to reinfection through cohabitation with tuberculous animals." Research on Johne's disease has resulted in the production of a fairly reliable diagnostic agent. Arthritis in pigs has been found to be caused by *Erysipelothrix rhusiopathiae*, the bacillus of swine erysipelas.

Amongst the virus diseases on which research was carried out were equine encephalomyelitis which broke out in the Western Provinces during the summer and autumn. Heavy losses were sustained. The virus was recovered from the brains of affected horses and is being investigated with the view to the production of vaccine. An outbreak of vesicular stomatitis in Manitoba was investigated and the virus was obtained for research purposes. Research was continued on distemper in fur animals, with particular reference to the possible involvement of the dog distemper virus. Dog distemper immune serum appears to have been of some value in protecting fur animals against the disease. Research into the virus of equine infectious anaemia might make more progress if a suitable small animal were available.

All attempts to discover the cause of bovine haematuria have been unsuccessful.

Notes are given on poultry diseases with particular reference to the diagnosis of pullorum disease.

Biological Products.—Details are given on the amounts of tuberculin, mallein, johnin, brucella antigen, brucella vaccine and anti-distemper serum prepared by the Division.

Diagnostic Services.—Statistical records of work are given of a total of 70,000 cattle tested for brucellosis. Only 57 reacted positively. Figures are given for agglutination tests for pullorum disease.—J. W. PULLIN.

CANADA. (1939). **Report of Work on Pathology and Bacteriology at Ontario Research Foundation, 1938.** [HADWEN, S.]—*Rep. Ont. Res. Fdn, 1938.* pp. 9-11.

An investigation was made to ascertain if satisfactory tests could be devised for the diagnosis of mastitis before clinical manifestations are evident.

G. pigs were protected against *Br. abortus* infection by intraperitoneal injections of fresh, unpreserved, anti-*abortus* rabbit serum.

An outbreak of disease suspected to be equine encephalomyelitis was studied. Attempts to reproduce the condition in g. pigs and horses with blood and tissues from fatal cases were unsuccessful.

Studies relating to *Oestrus ovis* were continued. Five hundred and ninety-three lambs were examined, and over 39% were affected. Morphological differences between the three larval stages have been noted, and have been illustrated by photomicrographs.

Studies on the parasites of game and fish were continued.—THOS. MOORE.

INDIA. (1937). **Proceedings of the Animal Husbandry Research Workers' Conference Held at New Delhi from the 17th to the 19th February 1936 with Copies of Papers presented by the Delegates and a Resume of Discussions thereon.** pp. ii+112. Numerous tables. [Numerous refs.] New Delhi: Govt. India Press. [8vo].

The Agenda for the Conference included the following subjects: Parasitology Research in the Punjab; Osteomalacia in Cattle; Congenital Blindness in Calves; Immunization against Rinderpest; Animal Nutrition Research; Bovine Surra; Hump Sore; Blackleg; Newcastle Disease of Fowls; Canine Disorders; Johne's Disease; Bovine Tuberculosis.

Most of these have been abstracted separately and appear elsewhere in the *Veterinary Bulletin.*

GOLD COAST COLONY. (1939). **Report on the Department of Animal Health for the Year 1938-39.** [STEWART, J. L.] pp. 26. 1 table, 1 map. Accra: Govt. Printer. [fcp] [2s.]

ANIMAL DISEASES.—There were no serious epizootics during the period under review and the disease situation was satisfactory. Only a few insignificant outbreaks of RINDERPEST occurred, among young stock on the frontier. 31,857 young cattle were immunized by the serum-virus method with a mortality rate of 2·8%. An insurance scheme to compensate for losses due to immunization, managed by the Native Administration, has proved a success. ANAPLASMOSIS was more in evidence than usual. Treatment with acaprin, which gives good results in babesiasis, was unsuccessful. There was no appearance of CONTAGIOUS BOVINE PLEURO-PNEUMONIA, which is a tribute to the efficacy of the prophylactic vaccine and justifies the policy of mass vaccinations. Over 75,000 cattle were vaccinated. TRYPANOSOMIASIS and tsetse eradication received much attention. Anti-tsetse clearings were maintained and extended and surveys to estimate the possibility of making new areas available for man and livestock were made. Sporadic cases of RABIES continue but prophylactic measures keep the situation well in hand. Other diseases reported on are :– anthrax, lymphadenitis, foot-rot, septic pneumonia in calves and calf diphtheria, theileriasis, fowl pox, and fowl cholera.

THE VETERINARY LABORATORY.—Was mainly engaged in the production of anti-rinderpest products, contagious bovine pleuro-pneumonia and anti-rabies vaccines, and in diagnostic work. Lymphadenitis affecting the prescapular glands of cattle was investigated but no specific agent was found. Research in the curative value of some drugs was carried out.

Animal Husbandry.—In spite of shortage of staff considerable progress was made. The chief feature is the virtual completion of the establishment of native administration farms, the major part of the cattle development scheme. Nineteen farms had been built and stocked with selected cows and bulls. Details and comments on each farm are given. The various types of cattle are discussed and the scheme of breeding types suitable for the different areas is outlined. Attention was being given to the question of milk production. The milk yield of various types of cattle was being assessed and recorded. The improvement of water supplies for livestock remains one of the most important problems. Experiments with scrapers drawn by bullocks showed that pools and dams can be made cheaply and quickly.

Other matters reported on include marketing of livestock (a trade which needs reorganizing); restocking of deserted areas; development of the pig industry in Togoland and training of Africans.—A. Fulton.

British Honduras. (1939). **Report on Livestock, 1938.**—*Rep. Dep. Agric. Brit. Honduras, 1938.* p. 19.

An outbreak of Rabies in September presumably introduced by dogs spread to bovines, equines and swine and resulted in the death of several cattle, horses and pigs. For a time the trade in pigs for the Belize market was at a standstill.

France. (1938). Extrait du rapport sur les travaux du laboratoire militaire de recherches vétérinaires pendant l'année 1937. [**Report of the Military Veterinary Research Laboratory, 1937**]. [Carpentier].—*Rev. vét. milit.* **22.** 77-83. [1 ref.]

Details are given of the diagnostic work on strangles, influenza, brucellosis, anthrax, glanders, tuberculosis, equine infectious anaemia, helminthiasis, mange and ringworm all in horses, and a few case records are given.—F. H. M.

Algeria. (1938). Rapport sur le fontionnement de l'Institut Pasteur d'Algérie en 1937. [**Report of the Pasteur Institute of Algeria for 1937**]. [Sergent, Ed.]—*Arch. Inst. Pasteur Algér.* **16.** 105-144. 6 plates, 2 tables. [Numerous refs.]

Work of veterinary interest was done on leishmaniasis, rickettiasis and piroplasmosis. [Original articles have been abstracted.]

Of laboratory analyses and tests performed, 2,535 concerned veterinary work. Full details are given of the amounts of serum and vaccines for both veterinary and medical use produced throughout the year, as well as a list of animals involved in the transmission of rabies to human beings.

I. Morocco. (1938). Rapport sur le fonctionnement du laboratoire de recherches du service de l'élevage du Maroc pendant l'année 1937. [**Report of the Research Laboratory of the Livestock Service of Morocco for 1937**]. [Velu, H.]—*Arch. Inst. Pasteur Algér.* **16.** 245.

II. Morocco. (1938). Extrait du rapport sur le fonctionnement du laboratoire de recherches vétérinaires des troupes du Maroc pendant l'année 1937. [**Report of the Army Veterinary Laboratory, Morocco, for 1937**]. [Velu, H.]—*Rev. vét. milit.* **22.** 85-89. [1 ref.]

I. Naganol as used against dourine in repeated doses was shown to be non-toxic; gonacrine is superior to zothelone for the cure of piroplasmosis; premunition of indigenous animals with virus-vaccine from the Pasteur Institute at Algiers is recommended. A condition referred to as an equine infectious paraplegia was

considered to be a form of strangles ; treatment with rubiazol and similar products is giving hopeful results.

The intranasal administration of pyrethrum is suggested for pulmonary strongyles in sheep. It was shown that cutaneous habronema lesions are keloid in structure.

II. Substantially the same as I.—F. H. Manley.

Tunisia. (1939). Fonctionnement des Services de l'Institut Pasteur pendant l'année 1938. [**Report of the Pasteur Institute for 1938**].—*Arch. Inst. Pasteur Tunis.* **28.** 272-291. 4 tables.

The work in the Veterinary department is under the direction of Dr Lucien Balozet.

The number of persons treated for rabies was 1,079. Details and statistics are given of the types of bites, the number of deaths, places of origin of patients etc.

53,443 specimens were examined, of which 174 were for veterinary purposes. Statistics are given of the various biological products prepared in the Institute during the year.

Ježić, J. (1939). Zavod za mikrobiologiju i hygienu veterinarskog fakulteta i veterinarska eksperimentalna stanica Ministarstva Poljoprivrede u Zagrebu Izvještaj o radu 1930-1933-1938. [**Report on Work Done Between 1930 and 1938 in the Institute for Microbiology and Veterinary Hygiene, Veterinary Faculty, Zagreb University, and at the Veterinary Experimental Station of the Ministry of Agriculture at Zagreb**].—*Vet. Arhiv.* **9.** 157-227. 23 figs., 5 tables, 4 graphs, 1 map. [French summary].

The Institute for Microbiology and Veterinary Hygiene was opened in 1930 and was part of the Institute for Bacteriology until 1933. In 1933 it was attached to the newly opened Veterinary Experimental Station of the Ministry of Agriculture. During that time, J. was Head of the two Institutes, and there were four scientific assistants. The chief function of the Experimental Station is the production of certain animal vaccines and products. Over 1,074,000 doses of sensitized lymph against sheep pox have been prepared according to the method of Bridré and Boquet. Over one million doses of single dose anthrax vaccine for subcutaneous administration have been made. Another vaccine has been prepared for intradermal administration. Several thousand doses of antirabies vaccine, mostly containing live fixed virus, have been prepared, both for preventive treatment and immunization of domestic animals after exposure to infection. Capsules of carbon tetrachloride have been prepared for the treatment of liver fluke infestation in sheep, and capsules of carbon trichloride for use on cattle. A watery solution of iodine was used against strongylosis on over 18,000 sheep, with universally excellent results. 160 districts were freed from rats.

There are facilities for study for advanced students.—B. Oswald (Križevci).

BOOK REVIEWS

Crofton, W. M. [M.D. Director of the Antigen Laboratory. Late Lecturer in Special Pathology, University College, Dublin]. (1939). **The True Nature of Viruses.** pp. xvii+166. 112 figs., 1 table, 1 appendix. London : John Bale, Sons & Curnow Ltd. [2nd Edit.] [4to] [15s.]

Crofton's thesis is that viruses are essentially a stage in the life-cycle of visible bacteria and that by means of vaccines which he has himself prepared from these bacteria he has been able to prevent or cure the diseases concerned. He puts

forward anew the view that *Past. bronchiseptica* and *Haemophilus influenzae* are the visible forms of the distemper and influenza viruses respectively, as well as the claim that specific bacteria can be isolated from vaccinia, small-pox, fowl-pox, measles, chicken-pox and mumps and that certain tumours and scleroses and degenerations are associated with virus forms of well known organisms, *e.g.* staphylococci, streptococci etc. In this second edition there are also added specific bacteria for foot and mouth disease and rabies, whilst the claim now is made that he has isolated *Salmonella cholerae-suis* from commercial swine fever virus.

Few data are given regarding the organisms concerned, except that in most cases they are small, Gram-negative, rather pleomorphic organisms with delicate growth requirements which very rapidly lose their pathogenicity, in some cases " becoming large coarse saprophytic bacilli ".

It is enough to say that, whilst extensive use is made of any literature or observation which might support the author's claims, he entirely fails to adduce satisfactory evidence that his cultures were virulent except when possibly contaminated with virus, or that they conferred protection against the virus concerned. Such positive results as were obtained in the case of accepted virus diseases can now probably be attributed to temporary survival of virus in his cultures, their rapid loss of virulence being due to final death of the virus (*e.g.* vaccines p. 20).

In conclusion it must be added that the text as a whole is tendencious and contains much improper, unjustifiable and personal criticism of medical and veterinary research workers or bodies.—A. W. STABLEFORTH.

BERTHO, A., & GRASSMANN, W. (1938). **Laboratory Methods of Biochemistry.** pp. xiv+281. 33 figs., 1 diagram. [Numerous refs.] London: Macmillan & Company. [8vo] [18s.]

The course of laboratory methods in biochemistry laid down in this book was that given by the authors in the University of Munich to advanced students with a competent knowledge of organic chemistry, and to medical students more concerned with physiological problems. These methods are adequately backed with theoretical discussion, which deals mainly with well established and settled points only. The practical courses given in British universities often tend to follow the lines of physiological chemistry; that given in the present work may be said to be more purely biochemical. In this way many of the present experiments, which hitherto have been accessible only in original publications or less available books, are brought within the reach of all biochemists—providing that their laboratories are equipped with the necessary apparatus!

One feels that the authors are very optimistic if they imagine the average student laboratory to be equipped with thermostat, one or two centrifuges, pH measurement apparatus, Van Slyke apparatus, polarimeter, and a Warburg, a combustion and a Zeisl apparatus! Indeed there are very few research laboratories so well fitted out. The apparatus required for physiological chemistry courses is so much simpler and less expensive, and naturally the courses pursued are dependent upon the available equipment.

In scope, the book is divided into (a) general introduction, in which there is a broad review of those chemical processes occurring in nature; (b) general technique, in which a detailed use of apparatus and of general experimental procedure is given—this includes description of the thermostat, pH measurements and general methods of purification, including dialysis, adsorption, centrifuging and classification; (c) biological materials and transformations, to which the greater part of the book is devoted. This is further subdivided broadly into three sections (1) substrates, including the chemistry of proteins, carbohydrates, nucleins

and lipines, with which are also considered sterols, bile acids, sex hormones, carotenoids and vitamin A, (2) enzymic hydrolysis, concerned with the study of proteases, carbohydrases and esterases, and (3) respiration and fermentation. This includes a full description of the dehydrogenases and a consideration of oxidation-reduction potential of oxidative enzymes containing heavy metals, and of glycolysis and experiments dealing with alcoholic fermentation.

The book is well cross-referenced, and to those whose lines of work carry them into the field covered therein, it should prove a very helpful guide from the standpoints of both theory and practice.—ALFRED EDEN.

WADDINGTON, C. H. [Sc.D., Fellow of Christ's College, Cambridge]. (1939). **An Introduction to Modern Genetics.** pp. 441. 160 figs., 5 plates. [Numerous refs.] London: George Allen & Unwin Ltd. [8vo] [18s.]

The student of genetics is to-day faced with a literature " probably larger than that of any other branch of experimental biology except medical physiology ". In this work Dr Waddington has done a great service to biologists in bringing together in one volume such a comprehensive mass of information dealing with recent developments in genetics. He is himself an eminent embryologist and he rightly adopts the viewpoint that genetics should not be regarded as a world of its own, but as intimately related to other branches of experimental biology. He therefore urges " that the connexion between genetics and other branches of biology, such as cytology, embryology, the study of evolution and of the biochemical nature of all constituents, is much closer than is often admitted ".

The book is divided into five sections. In the first part, entitled " Formal Genetics ", the author deals with the chromosome mechanism in the light of recent developments in cytology. In this section he contributes a very clear account of the mechanism of crossing over, " probably the most rapidly advancing part of formal genetics ". In the second part " Genetics and Development ", will be found an analysis of the various ways in which the genes control animal development. The above sections will probably be properly understood only by the specialist in modern genetics, but the two subsequent sections, " Genetics and Evolution " and " Genetics in Human Affairs ", contain much useful information for the more general reader. In these chapters will be found brief summaries on the application of genetics to animal and plant breeding. In a chapter dealing with the mechanism of evolution, the author stresses the importance of the accumulation of numerous small differences in every type of evolution. In the last section of the book, " The Nature of the Gene ", the author contributes an excellent summary of the state of present knowledge concerning the subject, and discusses several indirect ways in which this still unsolved problem can be approached.

The book contains an extensive bibliography in which numerous references are given to " summaries, reviews and articles in which general questions are discussed and further references given ". One criticism, which in no way detracts from the value of the book, is that several of the diagrams and maps are extremely difficult to follow. Dr Waddington clearly succeeds in proving the connexion between genetics and related branches of experimental biology.—N. J. SCORGIE.

CANDLER, A. C. [Edited by]. (1939). **Spectrographic Analysis in Great Britain.** pp. 80. 1 fig., 6 tables. [Numerous refs.] London: Adam Hilger Ltd. [8vo] [7s. 6d.]

This book, published by a well-known firm of instrument makers, deals with the uses of the spectrograph in chemical analysis, and comprises a collection of some 28 contributed articles of varying length by chemists most of whom are

attached to industrial concerns. As is pointed out in a short introduction, " the writers . . . were particularly asked to explain why they were using a spectrograph in preference to alternative methods of analysis ". Some of these writers were, perhaps, over-zealous in their advocacy of spectrographic over purely chemical methods, but in general, the principal advantages of spectrographic methods were stated as (1) in routine control, the methods are more economical in time, money and labour (2) they are more reliable for estimating trace elements, and (3) are applicable to very much smaller quantities of material.

These 28 short articles are grouped under the headings (1) metallurgy, (2) glasses, paints and fabrics, (3) soils and plants, and (4) art, archaeology and crime. Although only (3) is of direct interest to the general reader of this *Bulletin*, casual perusal of the book reveals that spectrographic methods are rapidly passing from the stage of qualitative to quantitative estimations of elements in vastly different materials, at least with an accuracy sufficiently exact for the purpose required. From the veterinary standpoint, the association of Mb with " teartness " in Somerset [*V. B.* **9.** 38.] and of Co with the so-called Dartmoor " pine " [*V. B.* **9.** 573.] have been established by spectrographic methods. [It may be pointed out that the relation of Cu to enzootic ataxia and of Se to " alkali disease ", although not specifically quoted, owed their discovery primarily to spectrographic methods]. The possibility of methods elucidating further obscure animal diseases of chemical origin, whether they be deficiencies or toxicoses, offers considerable promise, and though some of the praise of their utility may have been over-emphasized in this book, there is no doubt that the spectrograph has advanced from qualitative to quantitative application with, may it be said, a " practical utility " degree of accuracy.—ALFRED EDEN.

SITSEN, A. E. [Ehem. Direktor der Niederländisch-Indischen Aertzechule in Soerabaja]. (1938). Die Verwendung der Statistik in der Pathologie. **[The Use of Statistics in Pathology].** pp. 168. 10 figs., 66 tables. [Numerous refs.] Amsterdam : N.V. Swets & Zeitlinger. [8vo] [Guilders 3.40].

The usefulness of this book is not merely that it demonstrates the value of correct application of statistical methods in evaluating pathological data, but that it stresses the errors which may arise in misapplying such methods to material not really adequate for the purpose, and the author rightly insists that a clear apprehension of statistical technique is even more useful in planning observations than in analysing data after collection. For instance, in chapter XI, dealing with causes of mortality, he compares certain American data which have been used to support the thesis that coloured races are less susceptible to cancer than white races. In analysing the bases of compilation of the data, however, it appeared that in the case of negroes, only 5 % of the diagnoses were confirmed by autopsy or operation, as against 20 % for the whites, and that in far too high a proportion of both groups there was no really adequate basis of diagnosis at all.

The earlier chapters of the book, which concern human diseases only, provide a clear discussion of the usual statistical methods. Chapter IV deals with relationships such as body weight, weight and age ; chapter V with normal weights of various organs ; chapter VII with similar physical characteristics in relation to disease ; chapter IX with the significance in pathology of data on births, deaths, and expectation of life ; chapter XI with causes of death ; chapter XII with mortality rates in certain diseases, and chapter XIII with the influence of external environment on diseases and death rate. A brief final chapter summarizes the points to be considered in subjecting any given mass of data to statistical treatment.

—H. H. GREEN.

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